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NOTE ON TECHNICAL EDUCATION IN INDIA.

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His Excellency the Viceroy has expressed a desire that a memorandum on the condition and prospects of Technical Education in India should be prepared and submitted to him. The following Note is an endeavour to fulfil His Excellency's commands.

Introductory Division of progress in education into three periods.

1. The Education Commission, in reviewing the history of education in British India, divide the subject into three periods. They observe that each period is marked by a distinctive character of its own, which is common, more or less, to all the provinces of the Empire.

2. The first period embraces the years of educational activity prior to the Court of Directors' well-known despatch of 1854, when a new departure was taken. During this period the responsibility of the State for the education of the people was unacknowledged, and much of the good work then done was due to the endeavours of missionary and other philanthropic bodies, sometimes with, sometimes without, official assistance. The distinctive character of this period was, as far as State efforts were concerned, the attention which was paid to collegiate education.

3. The second period in the educational history of British India was ushered in by the great despatch of 1854 and lasted till 1871. Public instruction now became a recognized State obligation; but administratively the distinctive character of the period was the extension of secondary education, that is, of schools in which English is the medium of instruction, and the final standard aimed at is the University Entrance Examination.

4. The third period covers the interval between 1871 and the present time. It dates from Lord Mayo's decentralization scheme, and is contemporaneous with the control of Local Governments over educational matters in their respective provinces. Its distinctive character is the attention which has been paid to elementary instruction among the masses of the people.

Subdivision of third period.

5. This broad division of the educational history of British India into three periods loses sight, however, of some well-marked and interesting stages; and to give due prominence to these, the first period might well be subdivided into three. The first

subdivision would end about the year 1825, when effect was given to that provision of the Charter Act of 1813 which appropriated a lakh of rupees annually for educational purposes, and when the first *nuclei* of Committees of Public Instruction were established in the three presidencies. The distinctive character of this sub-period was the great activity of missionary bodies in the cause of education, and the small recognition afforded by the Government, always immersed in war, of its duty in the same cause.

The second sub-period may be considered as ending about 1840, after the publication of Lord Auckland's famous minute, by which the great controversy* between the "Anglicists" and the "Orientalists" was finally decided in favour of the former. This period was marked, not only by the controversy just referred to, but by the consolidation and extension of educational Boards and Committees which, in the previous period, had struggled into existence.

The third and last sub-period ended in 1854 with the reception of the Court of Directors' great Educational despatch of that year, and was, as the Education Commission say, distinguished by the attention paid to higher or collegiate education. Funds were scarce; and Indian administrators during this period were satisfied with the "downward filtration" theory of education.

6. Thus from the commencement of this century,—and, as far as Public Instruction is concerned, this practically means from the commencement of British rule,—education in India has passed through five cycles, each cycle covering a period of about fifteen years. First, there was the stage of missionary activity and State quiescence; then a stage of spasmodic and unsystematized official effort; next, systematic administration directed mainly towards the promotion of collegiate education; fourthly, the recognition of public instruction as a State obligation and an effort to fulfil it by the extension of secondary schools; lastly, the systematic development of elementary education among the masses of the population.

Origin of Technical Education.

7. In the preceding sketch of the progress of education in British India, it will be observed that no reference has been made to Technical Instruction. It is, indeed, true that in the despatch of 1854 a passage, quoted in the margin, occurs which might almost be construed as an encouragement and direction to establish Technical schools. And having regard to the history of the question,

* The "Anglicists" advocated education through the medium of English and the Vernaculars, in accordance with modern ideas; the Orientalists advocated education through the medium of the Oriental classics on old established rules. The controversy was decided in favour of English and the modern system, chiefly through the powerful aid of Macaulay, then Legal Member of Council.

"Our attention should now be directed to a consideration, if possible, still more important, and one which has been hitherto, we are bound to admit, too much neglected, namely, how useful and practical knowledge suited to every station in life may be best conveyed to the great mass of the people who are utterly incapable of obtaining any education worthy of the name by their own unaided efforts; and we desire to see the active measures of Government more especially directed for the future to this object, for the attainment of which we are ready to sanction a considerable increase of expenditure."

such a construction could be scarcely regarded as strained. The great advantages of Technical Instruction had in 1851 been brought home to the public mind in England. A Select Committee of the House of Commons had in 1835 enquired into the best means of extending among the manufacturing population a knowledge of the principles of Art and Design; and a "Government School of Design" established in London, with a system of grants-in-aid to similar schools in the manufacturing districts, had grown out of that enquiry. The progress made, however, was small, until the International Exhibition of 1851 drew public attention to the deficiencies as regards art of the English workman, and as regards science of the English manufacturer. The result was the creation in 1853 of the Department of Science and Art, which three years later came under the control of the Department of Education. It is, therefore, a not altogether improbable inference that the enlightened man* who drafted the despatch of 1854 had, by the passage quoted in the margin above, intended to suggest a far-reaching scheme of Technical and Industrial Instruction for India.

* Believed to be the late Mr J S Mill.

Growing necessity for Technical Instruction in India.

8. But if any such intention was entertained, it was not fulfilled—a result which should surprise no one, seeing that for Government employment the market then was not overstocked, while there were in India at the time but few of these mining, manufacturing, and other industrial enterprises which now afford such strong inducements to Technical training. Since then things have greatly changed. The supply of eligible candidates for Government service has far outrun the demand. The Bar, the Medical, and the Engineering professions absorb only a small portion even of our University graduates. Our schools and colleges are yearly adding to the crowd of young men whom our system of education has rendered discontented with the sphere of life to which they were born without fitting them for another. The difficulty is a growing one, and its seriousness is appreciated by all sections of the public. The following extract from a Native newspaper, *The Mahratta*, of May 9th, is a fair sample of the opinions which, at the present time, find constant expression in the Native Press:—

> We have had, roughly speaking, but a very short experience of the English liberal educational system; for a period of 25 or 30 years counts for little in a nation's life. And yet even in this short existence our experience has been rather

cstly. We have had educated in the various institutions supplied by Government hundreds of young men who have for the past few years found that their energy has been uselessly taxed; for their learning and labour make no difference in their position and prospects, or have rather changed these for the worse. We see on all sides a crowd of young men who have received a more or less liberal education, and who are whiling away their time in applying to the heads of several departments for employment. They curse their fate, which has left them unprovided for after a bootless labour of some ten or twelve years. They have a smattering knowledge of several subjects, but they have gone deeply in none, and even that smattering knowledge of theirs proves of no avail to them in the severe struggle for life that is going on around us. They find that their knowledge is of no help to them in the world where practical training is all that is respected. We do not mean to disparage liberal learning. Its importance and value have been for ages recognized by all men. It is not for us to speak ill of it. It is beyond our power. We do see its benefits in our midst. How can we then speak in a disparaging tone of it? But we can say that liberal education is a costly thing, and, for those who have to labour very hard for winning their bread, it is useless It is an ornament, and as such those only who are in easy or affluent circumstances can derive advantages from it. The greater majority are doomed to walk in humbler sphere of life which demands high training of a special kind, and hence, after an experience of the last 25 years, people are now beginning to see that greater attention must now be paid to this practical training which will fit men to their avocations in life, and which will moreover enable them to introduce improvements in industries and handicrafts.

A wave is passing over the country, agitating the minds of the people and drawing their attention to this subject. There is a stir on all sides —a stir which promises to result in some practical steps being taken to remedy the evil. The Bengalee, the Madrasee, and the Bombaite, each is now trying, to the best of his power and ability, to suggest a solution of this great educational problem of the day. But the movement is stronger on the Bombay side. Why, even ordinary men, from whom you would never expect any active interference in the public movements of the day, are coming forward with proposals for the establishment of Technical schools.

The Education Commission on Technical Education

9. Most questions of importance regarding education in India are fully and lucidly handled in the Report of the Education Commission, but the subject of Technical Instruction is an exception to the rule; for Technical Instruction was one of the few matters* connected with education on which the Commission was not required to report. It is true that in the resolution appointing the Commission, attention was called to the onesidedness of the existing system of secondary education, and that the Commission, in response to that call, proposed a bifurcation of the curriculum in High Schools,—one course leading to the

* The other matters were the Universities and the education of Europeans and Eurasians.

University, and the other fitting boys for commercial pursuits; but this is only touching the outer fringe of the great question with which it is now proposed to deal.

Recommendation of the Education Commission regarding practical training in schools.

10. Although the Education Commission were thus not required to discuss the subject of technical training, their comprehensive report could not entirely ignore a question which was rapidly growing in importance in public estimation. Accordingly in the Commission's Report certain observations* on the subject occur, which it is desirable to quote in this place:—

* Education Commission Report, pages 219-222.

Throughout India high schools have hitherto been regarded, not only or chiefly as schools for secondary instruction, intended for pupils whose education will terminate at that stage, but in a much greater degree—it may almost be said exclusively—as preparatory schools for those who are to become students of the University. It has been seen that middle schools comprise two well-marked classes,—those in which the scheme of studies is, and those in which it is not, governed by University standards. With one exception,† which will be presently noticed, no such distinction exists in the case of high schools, in all of which the course of instruction is determined by the matriculation standard, which again is arranged solely with a view to subsequent University studies. One of the questions put to witnesses before the Commission ran as follows: "Is the attention of teachers and pupils in secondary schools unduly directed to the Entrance Examination of the University?" The replies to this question are singularly unanimous. It has been felt in all provinces, and urged by many witnesses, that the attention of students is too exclusively directed to University studies, and that no opportunity is offered for the development of what corresponds to the "modern side" of schools in Europe. It is believed that there is a real need in India for some corresponding course which shall fit boys for industrial or commercial pursuits, at the age when they commonly matriculate, more directly than is effected by the present system. The University looks upon the Entrance Examination, not as a test of fitness for the duties of daily life, but rather as a means of ascertaining whether the candidate has acquired that amount of general information and that degree of mental discipline which will enable him to profit by a course of liberal or professional instruction. In these circumstances, it appears to be the unquestionable duty of that Department of the State which has undertaken the control of education to recognize the present demand for educated labour in all branches of commercial and industrial activity, and to meet it, so far as may be possible, with the means at its disposal. The Hon'ble Mr. Justice West, Vice-Chancellor of the University of Bombay, has expressed his views on this point in the following terms: "The preparation for ordinary business may with advantage proceed up to a certain point along the same course as that for literature and science. It is a defect of our system, as I understand it, that it does not provide for a natural transition to the further studies which may be the most

† [The reference is to classes in drawing and agriculture attached to some High Schools in Bombay.]

proper for a man of business, nor even propose to encourage and conduct such studies. When a boy reaches the age of about fourteen, he may have plainly shown that he has not the gifts that would make him a good subject for literary culture. His tastes or his circumstances may dispose him to be an engineer or chemist. He ought not then to be forced on in a line in which failure is almost certain. He should be put to work on matters that he really can master, unless quite exceptionally dull, such as arithmetic, rudimentary economics, mercantile geography, the use of manures, or others determined by the locality of the school and its needs. . . . The extension of this knowledge should be along those lines where it will be grasped and incorporated by the interests and teachings of active life. Still it should be education, aiming at making the mind robust and flexible, rather than at shabbily decking it with some rags of 'business information' or low technic skill. For these different aims, the present system makes no sufficient or distinct provision."

We do not attempt to define the course of instruction which might be imparted in schools of the kind suggested. The Departments in many provinces have dealt satisfactorily with the question of independent courses in middle schools; and it may well be left to them, in consultation with school managers and others interested in education, to determine the character and constitution of similar schools of a more advanced kind. Indeed, to attempt to fix a course for "independent" high schools would be to fall into an error of precisely the same character as that against which the proposal is directed; it would be to substitute one uniform course for another. But what is now chiefly needed is variety; so that the educational system as a whole may be such as more fully to meet the needs of a complex state of society. Nor would the introduction of the proposed alternative course into high schools involve any great expenditure; *for the bifurcation of studies need not take place until the student is within two years of the Entrance Examination, that is, until he has been eight or nine years at school.* His studies in the middle department will be sufficiently practical to prepare him for those he will take up in the modern side, sufficiently liberal to fall in with those of the academical side. It may be added that, with the establishment of these schools, full recognition would be given to the salutary principle that the course of instruction in schools of every class should be complete in itself. The Madras Provincial Committee draws attention to the fact that little more than half of those who pass the matriculation examination of that University proceed to the First Arts standard; and though the disparity is less conspicuous in other provinces—in Bengal, indeed, it is stated that more than 90 per cent. of those who matriculate are admitted to colleges,—yet it is probable that in all provinces the institution of the alternative standard would meet the popular wishes and answer a real need. We therefore recommend *that in the upper classes of high schools there be two divisions,—one leading to the Entrance Examination of the Universities; the other of a more practical character, intended to fit youths for commercial or non-literary pursuits.*

[The italics are not in the original. The present writer differs from the view expressed in so far as he is convinced that the bifurcation should take place earlier. On this point he agrees with the Madras Government, as will appear later on.]

Further on in their report the Commission recommend that a certificate of having

passed by either of the alternative courses should be regarded as qualifying for the public service in its subordinate grades.

Policy of the Government of India on the subject of practical and technical training.

11. The preceding extract expresses the Commission's view as to the general direction to be followed in grafting a system of practical training on our present scheme of secondary instruction; but it will be observed that the training recommended was of a general or preparatory, and not of a technical, character. The Government of India, however, in reviewing the Commission's Report, was desirous of giving the recommendation the fullest significance which could be attached to it; and, therefore, having previously secured the consent and support of Local Governments, His Excellency the Viceroy in October 1884 sanctioned the publication of a Resolution, from which the following passage is quoted:—

> The bifurcation of studies suggested by the Commission is of special importance at the present time. Every variety of study should be encouraged which may serve to direct the attention of Native youth to industrial and commercial pursuits. To be of any value, the bifurcation should be carried out, as the Commission advise, in the High School course. To postpone it till after matriculation at the University, as proposed by some authorities, would to a great extent render its advantages futile.
>
> The Government of India commends the other general recommendations of this chapter to the adoption of Local Governments. * * * Efforts should be made to call forth private liberality in the endowment of scholarships not only in Arts Colleges, but for the encouragement of Technical Education.

Such was the policy which the Government of India, after a careful examination of the facts, promulgated on this question. That policy enforced the necessity of making the course of study in High Schools more practical than it was; and it recognized the desirability of encouraging Technical Instruction. Beyond such a recognition, however, the Education Commission or the Government of India did not then go. No indication was given of the direction in which, or of the means by which, such Technical Instruction might be imparted. In this note an effort is made to supply such an indication.

PART II.

Present condition of Technical Education in the various provinces of the Empire.

12. Before attempting to make any suggestions for the promotion of Technical Instruction in India, it is essential to form a conception of the present condition

of Technical education in the various provinces, and of the steps which are being taken to improve that condition. The position on both points must be correctly appreciated before any proposals can be made in the way of modification or extension of existing arrangements. The following remarks, therefore, are intended to be as brief a statement as the subject will allow of the present position of Technical education in the various provinces of the Empire, and the nature of the steps which are being taken to extend and improve it.

13. Technical education may be divided into two classes—University education and School education. The following statement is intended to show, at a glance the various classes of Technical colleges and schools already in existence, the number of institutions of each class, and the attendance at the close of the last school year:—

Statement showing the condition of Technical Education in British India in 1884-85.

	UNIVERSITY EDUCATION.						SCHOOL EDUCATION.												CLASSES IN HIGH SCHOOLS IN				GRAND TOTAL.	
	LAW.		MEDICINE		ENGINEERING		SCHOOLS OF ART.		SCHOOLS OF LAW.		MEDICAL SCHOOLS.		ENGINEERING AND SURVEYING SCHOOLS.		INDUSTRIAL SCHOOLS		SCHOOLS OF AGRICULTURE.		ART.		AGRICULTURE.			
	No. of colleges.	Attendance.	Number.	Attendance.	Number.	Attendance.	Number.	Attendance.	Number.	Attendance.	Number.	Attendance.	Number.	Attendance.	Number.	Attendance.	Number.	Attendance.	Number.	Attendance.	Number.	Attendance.	Institutions.	Attendance.
Madras ...	1	127	1	124	1	19	1	102	...	...	5	197	1	100	6	240	1	96	.	...	.	...		
Bombay ..	2	244	1	277	1	102	1	251		...	3	257	2	98	7	307	1	46	36	2,713	8	269		
Bengal .	8	640	1	132	1	42	1	167	...	...	7	672	5	278	5	172		..	..	...	..	...		
Punjab		.	..	...	...	...	1	85	1	71	1	188	.	..	4	93		.	..	...	..	...		
North-Western Provinces.	3	111	.	...	1	155	...	...	...	..	1	89	..	...	2	186	.	...	.	...	...	...		
Central Provinces		...	..	...	..	...	..	...	...	...		..		...	19	316		...	..	...	..	..		
Assam ..	..	...	..	...	...	.	...	...	...	...	.	...	7	163	1	18	...	...	...	...	...	...		
Burma ...	...	...	...	...	...	...	...	...	...	...	...	...	5	110	1	38		...	.	...	...	...		
Hyderabad Assigned Districts.	...	...	...	...	.	...	...	...	...	...	...	...	...	...	...	...	.	...	...	...	...	...		
Coorg ...	...	...	...	...	...	..	..	...	...	.	.	...	...	..	..	...	...	...	..	...	...	.		
Total ..	14	1,131	3	533	4	218	4	655	1	71	17	1,404	20	755	45	1,379	2	142	36	2,713	8	269	154	9 389

There is also a Forest School at Dehra Dun and one at Poona.

14. Before any comment is offered on the figures for each province, a comparison is invited between the statistics of Technical Instruction exhibited in the foregoing statement and the condition of education generally throughout the Empire. The latest educational returns show that the total number of pupils under any sort of instruction in Public (including Aided) Institutions in British India is about 3,095,000. Of these, about 2,665,000 pupils were under instruction in primary

Significance of the preceding statistics.

or rudimentary vernacular schools, in which practically no sort of technical training is given. The remaining 430,000 were receiving an education of a more advanced description, and three-fifths of them were learning English. But to only 6,287 of these 430,000 students was an education of a technical or professional character being imparted, whereby they could earn an independent livelihood.* If it be remembered that the vast mass of those students belongs to the lower middle classes, whose patrimony is chiefly their education; that the landed proprietors are not largely represented in our schools and colleges; that trade and commerce contribute no more than a tithe of the number of pupils, the full significance of the above figures will be appreciated, and the urgent necessity of giving to, at all events, some branches of our system of State education a more practical bent will be perceived.

* There are 141 training schools for masters and mistresses, attended by 5,132 students; but these are mostly normal schools, intended to provide teachers for village primary schools. The number of children attending the Drawing and Agricultural classes in Bombay has also not been included, as the instruction is only rudimentary and not exclusively technical.

Condition of Technical education in the Universities.

15. Turning from the main aspect of the statement to its details, some remarks may now be offered on the arrangements which exist for Technical Education in the Universities of the various provinces, beginning with Madras.

Madras Presidency.

Law:

The Madras Presidency contains only one School of Law, that attached to the Presidency College. The degrees given are Bachelor and Master in Laws; and to qualify for the Bachelor's degree, candidates must have obtained the degree of Bachelor in Arts. One hundred and twenty-seven students attended the school last year on payment of a term fee of Rs. 50 each. Fifty-seven students presented themselves for the B. L. degree, of whom only 24 passed, the results contrasting unfavourably with those of preceding years. Radical changes in the working of the Law classes were, however, sanctioned in 1884, and an additional Professor appointed. The work is divided between two Professors according to a scheme approved by the Department of Education, each Professor giving tutorial class instruction as well as instruction by lectures. The latest Educational Report states that these changes are calculated to "produce substantial results by raising the general legal knowledge throughout the Presidency." It would seem, then, that no further improvement is immediately called for in regard to the Faculty of Law in Madras.

16. The Madras Medical College, established as a Medical School in 1835, was raised to the status of a College in 1851, and affiliated to the Madras University in 1877. Its certificates are recognized by the Colleges of Surgeons of London, Edinburgh, and Dublin—a recognition which, it is stated, induces many students to proceed home for their degrees in preference to graduating in the Madras University. The College has a senior division leading to the University degree, and a junior division for the education of the apothecary or medical practitioner class. Last year the senior division contained 120 male and 4 female students; the junior division contained 91 students, 7 being females. The instruction is stated to be all that need be desired; but the number of candidates for degrees has hitherto been very small, owing, it is stated, to the preference shown for British degrees.

Medicine.

17. The Madras Civil Engineering College consists of two departments—the Collegiate and the School Departments. After a prolonged discussion, the College was reorganized last year. The object of the Collegiate Department (which was established in 1862) is to train students, who have received a liberal education, for employment as Engineers or for the degree of B.C.E. in the Madras University. There is also a Mechanical Engineering class. One engineer's appointment in Government service is guaranteed annually to the College; but still the College is quite local in its effects, and the Public Works Department of the Government of India knows very little about its results. In all Departments the course seems to be wholly theoretical, which is a serious defect.

Civil Engineering.

The School Department trains students for the subordinate engineering posts under the Public Works Department, Local Funds, Municipalities, and there are also classes for surveyors and draftsmen. The upper subordinate (*i.e.*, School) students have a year's practical training after leaving the School before appointment to the public service.

The average number of students on the roll of the Collegiate Department last year was 19 and in the School Department 106. These numbers are an improvement on preceding years, and the Report for 1883-84 stated that applications for admission to the Collegiate Department are more numerous than the accommodation and teaching capacity of the Institution

can meet. The popularity of the College is said to be increasing, while students of merit are reported to find no difficulty in getting employment. The great want seems to be facilities for practical training, which, having regard to the existence in Madras of large railway *termini* and workshops, ought not to be insurmountable.

Bombay Presidency.

Law.

18. There are two Schools of Law in the Bombay Presidency—the Government Law School and the Law Class of the Deccan College. The foundation of the former is due to a subscription raised to perpetuate the memory of Sir Erskine Perry, formerly Chief Justice of Bombay, and for many years President of the Bombay Board of Education. The Law classes of the Deccan College were established in 1884 with the object of enabling students of that College to keep some of their law terms while undergraduates. Both Schools are affiliated to the University; but the lectures in the Deccan College deal only with the introductory subjects, which form the first year's course in the Government Law School. The students attending the Law School number 180, while those attending the class in the Deccan College number 64. The Government School of Law at Bombay seems to be on a satisfactory footing, but the following rather scant notice is all that appears in the last Education Report regarding it:—

> Seventy-nine candidates presented themselves for examination, of whom 54 successfully passed it. Thirty-four candidates presented themselves for the LL.B. Examination of the University of Bombay, of whom 13 passed.

The Grant Medical College.

19. This College was established in 1845 as a tribute to the memory of Sir Robert Grant, who was Governor of Bombay. It was affiliated to the Bombay University in 1860 as a College for Medical education. Its students are divided into two classes—those who are educated for the University degrees, and those who are educated for the grade of Apothecary; the former numbering last year 277, and the latter 76. Besides these, there were 17 female students. Dr. Cook, the Principal, in reviewing the events of the thirty-ninth year of the existence of the College, remarks as follows:—

> It is hardly needful for me to point out how great a boon the institution of a Medical School such as this has proved to the rapidly-growing city, whose need of medical aid has annually increased with its increasing numbers, and which, while, on the one hand, it has tendered its plea for

extended assistance from skilled medicine, has on the other preferred its educated sons as students in such numbers that the College is taxed almost beyond its strength and resources to meet the demands on its teaching capacity. The annual reports for several years have with pleasure and some pride adverted to this steady extension, showing that, while so late as the year 1865 the number of matriculated students was only 20, it has during the past five years averaged 66, and that during the last quinquennial period 2 alone of the 104 students have passed out to swell the ranks of the qualified medical practitioners of Bombay. Amongst these, as indeed among their predecessors, there have been many who have most worthily acquitted themselves as students, and become fitted to support the character and dignity of the profession which has admitted them into its membership. The test afforded by the examination instituted by this University before conferring its degree in Medicine is a searching and satisfactory one; and all who succeed in being placed in the first or honour division at their final examination, may fairly be considered to be qualified to take their place in the higher ranks of Medicine.

In commenting upon Dr. Cook's Report, the Director of Public Instruction observes as follows :—

Dr. Cook observes that the College is taxed almost beyond its strength to meet the demands on its teaching capacity, and he looks forward to the day when a College of experimental science, with laboratories fitted for scientific experiment and research, shall be founded in Bombay. But in the meanwhile the need for assistant teachers, especially in Anatomy, is acutely felt. Hardly less essential than the increase of teaching power is the need for enlarged accommodation; and the addition of another wing to the College, and of two extra rooms to the Obstetric Institution, is represented as a pressing want.

Of the 370 students borne on the rolls, 112 are Christians, 148 Parsis, 107 Hindus (including 50 Brahmans and 35 from the trading castes), 3 Jews, and only 5 Mahomedans. All classes of the community, except the cultivators, are fairly represented. Government and Native State officials contribute 50, pensioners 25, merchants 54, and the priestly caste 25. Sons of persons of property are returned at only 12. The wide representation of all classes of the community is a satisfactory feature, and the practical benefits conferred on the community, as illustrated by the large attendance at the College, afford the best justification for the additional accommodation and increase to the teaching power asked for by Dr. Cook.

The Grant Medical College seems to be a well managed and successful institution sufficient with such improvements as the Government of Bombay may make from time to time to meet all the requirements of the higher medical education in the Western Presidency.

Civil Engineering.

20. The Poona College of Science, formerly the Poona Civil Engineering College, arose out of a school established in Poona

in 1851 by Government for the purpose of educating subordinates for the Public Works Department.

The College is divided into four departments :—

(*a*) Matriculated students studying for University degrees in civil engineering.

(*b*) Matriculated students studying scientific agriculture in the College and the farm attached to it.

(*c*) Matriculated students who study Forestry.

(*d*) Students studying in the College and attached to workshops with the object of becoming overseers, &c.

Attached to the Engineering College are extensive workshops, which have from time to time been extended from the profits made on works executed in them. In these workshops practical instruction is conveyed, and work of various kinds executed for Government and the public. The University of Bombay requires candidates for the L.C.E. degree to perform manual work before the examiners; and this secures for the students in the College a course of practical training noticed as wanting in Madras. The students in the lower or School classes, who become overseers, &c., have to go through a workshop course of from 2 to 4 years' duration, and it is by them that the work in the shops is chiefly executed. The attending the Engineering College last year was 103, and the Engineering School 67. Regarding the University classes, the following passage is taken from the last Report of the Director of Public Instruction :—

Fourteen students appeared for the L.C.E. Degree, of whom 7 passed—1 in the first class, 1 in the second class, and 5 in the pass class. Twenty-nine students appeared for the F.C.E. Examination, of whom 25 passed—2 in the first class, 11 in the second class, and 12 in the pass class. There was a large number of entries in the Junior Engineering class after the late Matriculation Examination, and several promising students have joined the College from the Province of Mysore. The Bangalore Engineering College has been abolished, and the Mysore State finds it advantageous as well as economical to send pupils here, the State paying to certain selected pupils liberal stipends to enable them to live comfortably in Poona and pay their college fees. The men thus sent are of course picked men. I can speak in the highest terms of their intelligence and industry, and their education prior to their joining this College has been most carefully conducted. I

believe that somewhat similar arrangements will be made in the Nizam's State, and that, instead of keeping up an Engineering College at Hyderabad, Deccan, a few of the best youths will be selected by the State, sent to this College, and employed by the State on the completion of the course of study. I think the system will be advantageous both to the youths who are thus educated and to the States which will subsequently find them employment. The enlargement of ideas which will necessarily follow a removal from the narrow sphere in which these youths have been accustomed to move cannot fail to produce a beneficial and lasting effect on them. The pupils of this College first obtained a footing in Mysore nine years ago, and three of its alumni who went to Mysore between the years 1875 and 1876 are now Executive Engineers in charge of districts, and in receipt of salaries of Rs. 400 per mensem.

Two appointments annually to the Engineering Establishments of the Government are guaranteed to this College, which, as far as can be judged, may be pronounced to be on the whole quite abreast of the requirements of the time and place.

BENGAL.

Law Schools.

21. In six Government* and in two independent Colleges† 619 students are reading Law. Owing to the competition of the independent Colleges, which are situated in Calcutta, the Law classes in the Presidency College were closed in 1884. This is the first instance of private enterprise in educational matters actually beating the Government out of the field. The number of candidates for the degree of Bachelor of Laws in the last year reported on was 140, of whom 77 passed. The percentage of successful candidates indicates that the instruction conveyed is fairly satisfactory, and the opportunities afforded for learning Law seem at present to be adequate.

* Hooghly, Kishnaghur, Dacca, Patna, Rajshahye, and Cuttack.

† Metropolitan Institution and City College.

Medical College, Calcutta.

22. Originally the preliminary standard of education qualifying for admission to the Medical College was the University Entrance Examination, as it still remains at Madras and Bombay. But about ten years ago the standard was raised from the Entrance to First Arts Examination. The immediate consequence was a great reduction in the number of students. In 1878, when the new standard of preliminary education became familiar, the numbers began to rise again. But then with the object of raising the standard of attainments a new rule was passed that each candidate must pass in every subject, and not merely obtain a certain number of marks on the aggregate of subjects. The enforcement of this rule also brought about a fall in the number of students during the next few years (1879—1882),

though probably a decay in the demand for medical practitioners had also some effect. The numbers, however, have since increased, and now stand at 132, while the standard and professional attainments of the students have been greatly raised.

During 1883-84 female students were admitted to classes for study for M.B. or L.M.S. The question of their admission had been discussed previously; but, owing to the attempt made to allow them admission with a lower preliminary test of general education, the scheme fell through. They are now admitted on equal terms with male students.*

* Female students are admitted on a lower preliminary educational test to the Medical School, which prepares men of the hospital assistant or general practitioner's class.

The course of instruction for M.B. and L.M.S. now extends over five years; and during 1883-84, of 28 candidates for final examination, 10 passed. During 1884-85 a considerable increase in the number of students for medical instruction at the Medical College took place.

In the Medical College School military pupils of the Apothecary class are also educated, and at present the class numbers 60 pupils. This subordinate class has also been thrown open to women, of whom there are now thirteen students attached to the College.

Some women are also instructed in Midwifery in the adjacent Eden Hospital, and pass out annually as qualified *dhais*, or midwives.

Civil Engineering.

23. At the Seebpore College near Calcutta candidates for the degree of Civil Engineering have to go through a four years' course of theoretical training, with which some practical work is combined. During this period they spend three hours daily during term in the carpenters and pattern shop, smithy, foundry, or fitting shop. Part of the last year's course consists of practical brick-making in the Government brick-fields at Akra; and of practical work in stone masonry, brick-laying, managing workmen, and keeping accounts. Those who are selected for Government employment have to spend another year in the Department without pay as probationers, but they are distinguished students, who are generally in the receipt of Government scholarship.

Besides the collegiate course described above, there are courses for Mechanical Engineers, Civil Overseers, and Mechanical Overseers. These courses follow generally the outlines of the course for L.C.E. with appropriate modifications.

Last year the number on the rolls of the College Department was 42; and on the rolls of the Subordinate or Apprentice class 107. The Principal of the College

reports that considerable apathy still prevails among the students; but, on the other hand it is stated that those who have passed through the College or School find little difficulty in getting employment.

NORTH-WESTERN PROVINCES AND OUDH.

Law.

21. The information available is somewhat meagre: but it is gathered that there are three Schools of Law attached respectively to the Benares, Muir, and Canning Colleges, which are affiliated to the Calcutta University. The Benares Law School was opened in 1884, and consists of 17 students, who defray the whole cost of the lectures. The Law Classes of the Muir College are attended by 31 students, while 57 students attend those of the Canning College at Lucknow.

Engineering.

25. The Thomason Civil Engineering College at Roorkee, founded in 1817 by Mr. Thomason, then Lieutenant-Governor of the North-Western Provinces, and affiliated to the Calcutta University in 1864, was first designed to supply the Department of Public Works and Survey Departments with Assistant Engineers, Overseers, and Sub-Overseers. It is now, however, open to the public. The College contains three classes:—(*a*) Engineer Class; (*b*) Upper Subordinate Class; (*c*) Lower Subordinate Class. The Engineer Class is open to Europeans and Statutory Natives of India, who have passed the Entrance Examination of the University or other similar test. The students go through a two-years' theoretical course, during which they receive practical instruction in surveying and preparing projects. After the two years' course is over, students are eligible for appointment as Engineer apprentices, so far as vacancies are available, and are supposed to undergo a practical training. After being favourably reported on, selected students are appointed Assistant Engineers in the Department Public Works, four or five appointments of the sort in alternate years being attached to the College. It is stated that some very valuable Engineers have been turned out of this College. Their instruction in surveying is most thorough. They exhibit great skill in managing native workmen and in applying the resources of the country.

The Upper Subordinate Class also consists of students who have qualified by a preliminary literary test. They have two years' theoretical course in the College, and afterwards one year's practical training. This class includes non-commissioned officers from British regiments, as well as "Natives" of India.

The Lower Subordinate Class are all Natives of India by descent, and a qualifying preliminary education is necessary for admission. Soldiers of the Native Army desirous of learning so much surveying as suffices for reconnoitring purposes are received in this class without previous qualifying education. Generally the courses of study in the principal classes are varied, but include Mathematics, Civil Engineering, Surveying, Drawing, and Urdu, the extent read being of course different in each class. Besides, the Engineer Class learn experimental science and photography. The College also holds examinations and grants certificates of qualification as Sub-Engineer, Overseer, and Examiner of Accounts, Department of Public Works, to all candidates who present themselves, under certain rules. Several valuable stipends and studentships are attached to the College; and the numbers attending the various classes last year were—

Engineering Class	...	21
Upper Subordinate Class	...	78
Lower Subordinate Class	...	43

There are no Workshops attached to the College; but in the neighbourhood are situated the well known Roorkee Workshops belonging to the Local Government. The students visit these; but they do not perform manual labour there, as at Seebpur and Poona. Their visits, therefore, are practically of little value. It is understood that there is some idea of disposing of these workshops as unnecessary for Government purposes. But preferably it is submitted they should be made over to the College, and a system of practical training added to the theoretical course.

26. Before passing on to Technical Instruction in Schools, the following statement, compiled from the University Calendars, is presented. It shows the number of degrees granted by each University since its foundation in the three faculties of Law, Medicine, and Engineering :—

Statement showing the number of persons who have taken degrees in Law, Medicine, and Engineering in the Universities of Calcutta, Madras, and Bombay.

Names of Universities.	NUMBER OF PERSONS WHO HAVE TAKEN DEGREES IN											
	LAW.						MEDICINE.				ENGINEERING.	
	D L.	Honours in Law.	B. L.	L. L. B.	L. L.	M. L.	M. D.	Honours in Medicine.	M B	L. M. S.	B. L. E.	L. C. E.
Calcutta .	8	6	1,052	...	262	..	5	8	89	465	27	92
Madras ...	...	...	231	...	...	7	5	.	11	29	38	...
Bombay ...	1	..	..	131	...	...	2	...	...	170		117
Total ...	9	6	1,283	131	262	7	12	8	100	664	65	209

27. The preceding remarks will have given an idea of the condition of Technical Education of the higher or University character in the various Presidencies which possess colleges, affiliated to a University, in which the higher instruction is imparted. The following observations are concerned with the condition of Technical education of the lower or school order :—

Technical Education in Schools.

Madras Presidency.

28. In the Report on Public Instruction for 1883-84, the aim of this school is declared to be the development of those industrial arts which have for their end the construction and decoration of the articles, whether of metal, wood, stone, or clay, which are required by the exigencies of modern life in India. The attendance at the school, which in 1883 was 147, rose in 1884 to 162, and it is stated that "a further advance in strength is expected to take place when the scope of the institution is enlarged, and the services of a competent assistant to the present Superintendent are secured."

School of Arts.

The Madras Education Report goes on to speak of the school as follows :—

A pleasing and novel feature in the year's history is that the Institution is beginning to fulfil its chief object—the supply of skilled labour for various art in districts—some students having obtained suitable employment. The engagement of one as a designer of textile fabrics in a coral firm is specially gratifying, for it is in relation to improved design that the school is calculated to benefit the industries of the country. Instruction in freehand was more successful than that in geometrical drawing, the failure in the latter subject being probably due to the low general educational standard of most of the students.

Useful instruction has been given and progress made in wood-carving, engraving, metal-work, and in the manufacture of stained glass windows, the students having been instructed in the process of execution as well as of design.

The Institution seems to have been very active in its manufacturing branch, turning out a quantity of high class work. Experiments too have been made in various directions as regards pottery, and valuable information collected. The discovery of superior kaolin, uncontaminated by iron, near Salem, will, it is hoped, prove an important one.

The expenditure amounted to Rs. 26,261-15-1, and the receipts to Rs. 43,615-5-8.

29. The information of a general or descriptive character available regarding the Madras mofussil Medical Schools is very scanty ; but from the Education reports for the two last years it is gathered that these schools, five in number, are concerned

Medical Schools.

with the training of the Apothecary class. The most flourishing school is that attached to the Madras Medical College. It is attended by 86 students, seven being females, and the progress made is reported to be satisfactory. The attendance at the Medical Schools situated at Royapuram and Nellore show signs of decrease, but the Tanjore and Madura schools were improving. On the whole, the schools, though apparently not very flourishing, seem to serve a useful purpose in Madras.

Engineering

30. The only Engineering School in the presidency is the Junior Department of the Civil Engineering College, to which reference has already been made under the head of University Education. The course of instruction comprises elementary mathematics, engineering, surveying, drawing and estimating, bricklaying, and the Madras vernacular languages. One scholarship of Rs. 13 per mensem tenable for two years, five scholarships of Rs. 15 and ten of Rs. 10 each tenable for one year are attached to the school; and, besides these, ten studentships of Rs. 10 each per mensem are available for European non-commissioned officers and soldiers who join the school. The institution derives no revenue except from the State. The instruction conveyed in the school is believed to be too theoretical, facilities for practical work being deficient. Still, it is stated, that passed students of the school find no difficulty in getting remunerative employment either under Government or Local Boards or on Railways, and this fact tends to make the school popular and applicants for admission numerous. It is therefore a matter for regret that, owing to insufficient accommodation, all applicants for admission to the school cannot be received. An excellent feature of the organization seems to be a system of examination by which candidates, not being students of the school, appear and obtain on passing examinations certificates of competency as draftsmen and surveyors.

Industrial Schools.

31. There are six Industrial Schools in the presidency, three being situated in Madras, and three in the mofussil. The Madras schools, attended by an average of 60 students each, are well spoken of; but the other three seem unimportant. The following description by the Inspector of Schools of the Nazareth Industrial School in Madras, attended by 61 pupils, seems to indicate that as educational

institutions, the best of these Industrial Schools is at present of little value :—

In addition to the above articles (chairs, despatch-boxes, &c.), the boys have assisted in making the roofs of six different buildings, and they are being taught to make wheels for country bandies, spinning wheels, and ploughs. Three boys have a fair knowledge of blacksmith's work, and they can make knives for planes, chisels, and nails. It is very desirable to develop this trade and to build a smithy, in connection with which coppersmith's work might perhaps also be carried on.

The tailor boys can (most of them) work the lock-stitch sewing machine. Some of them have recently commenced a little embroidery work in gold and silk thread. I saw them cutting out and stitching ordinary articles of dress, such as short coats, &c., and am glad to say that they worked very neatly.

A new loom has been built for the weaver boys, and there are now five looms at work. There is a good demand and ready sale for the cloths woven here. Cloths of different patterns are being made in this department; some of them are very nice indeed. A machine for winding the yarn has recently been made and is now in use.

Fourteen of the girls learning to make pillow lace are orphans. I learn that specimens of the lace turned out by these girls have been sent to the Needlework Exhibition held in Madras in connection with the National Indian Association.

Agricultural Schools

32. Madras and Bombay share the distinction of being the only provinces of India which have Schools of Agriculture. India is pre-eminently an agricultural country : the vast mass of the people are agriculturists; the Government derives a third of its revenue from the land; but hitherto only in Madras and Bombay has any effort been made to give instruction in a subject which so intimately concerns the welfare of the Government and the people. Madras has had an Agricultural School for some years, from which, since its establishment, nearly 100 students have passed out. It is stated that the passed students of the school are in request, and that the school is now being regarded as an avenue to remunerative employment. The course of study is varied, consisting in the different classes of arithmetic, book-keeping, geology, physical geography, mechanics, hydrostatics, agriculture, practical farming, surveying, veterinary, and hospital practice. It is stated that Native States and Local Bodies provide stipends for a certain number of students of the school, and that a considerable proportion of the students come of agricultural families. Last year the number of students in the rolls was 95, which is an improvement in the preceding seasons. Judging by the recent examinations, also, the educational attainments of

the students are higher than in previous years; and the reports submitted to the Local Government are stated to afford evidence of careful teaching. The least satisfactory feature in connexion with the school is its financial aspect. "The expenditure," says the Education Report for 1884-85, "amounted to Rs. 39,242-5-0, and the receipts from fees, &c., to Rs. 622-14-2. The disproportion is very great, though considerable allowance must be made for a Technical Institution which cannot but be costly, specially during its early days, and until its certificates are of assured value in the competition for remunerative employment. When this condition is secured, it cannot be doubted that fees may be levied at rates which will suffice to cover a large portion of the cost."

33. Such then is the condition of Technical Education in the Madras Presidency at the present time. All told, the students of Technical Colleges and Schools scarcely exceed 1,000 out of a school-going population of about $4\frac{1}{4}$ lakhs. The provision for Technical teaching in Madras is not adequate to the requirements of the case, though the following remarks of the Director of Public Instruction show that the present state of things in this respect is an improvement on the past:—

> During the last quinquennium the number of Technical or Special Institutions has more than doubled, and the attendance has nearly doubled. Under Art and Industrial Institutions some progress has been made, but not great; but further improvement, extensive and still more intensive, may be expected when the scheme for the development of Technical Education is brought into force, if it receive liberal financial support.

Bombay.

The Poona Engineering School.

34. In connexion with the facilities afforded in the Bombay Presidency for Technical training in schools, it may be well to begin with the junior or school department of the Poona College of Science, on which some remarks have already been made in connexion with University education. The following passage, extracted from the last Education Report of the Bombay Presidency, sets forth the present state of things in regard to Engineering and Agricultural Classes, and besides indicates what are Mr. Lee-Warner's opinions on the broad question of Technical training:—

> The average number on the roll (of the Workshop and Sub-Overseer class) throughout the year was 77, with an average daily attendance of 62. The number of apprentices in the

workshops at the close of the official year was 67, of castes and creeds as follows :—

11 Christians	...	Europeans	... 2
		Eurasians	... 2
		Portuguese	... 7
51 Hindus	...	Brahmans	... 35
		Artizans	... 11
		Parbhus	... 3
		Others	... 2
Mahomedan	...	...	... 1
Jews ...	...	...	... 3
Parsi ...	...	...	... 1

This shows an increase of twelve on last year's attendance, and I am glad to report that the artizan class is better represented in the above table than it has been in any previous year.

Thirteen apprentices completed their workshop course during the year. Of these, three left and obtained employment, while ten presented themselves in December last for the Entrance Examination of the Sub-Overseer class. All passed the Entrance test, and are now studying in the college for the Sub-Overseer's examination which will be held in January 1886.

The Sub-Overseer class at the close of the year consisted of 15 students—an increase of one on the total of the previous year.

* * * *

Eight candidates were declared by the examiners to have passed the examination, and most of these have since obtained employment.

The Principal dwells on the urgent need for adding to the staff of the workshop a foreman moulder, a pattern-maker, and other teachers of trades. The carpenter's shed also requires additions. Owing to the late pressure on the finances, these proposals have not yet received the sanction of Government; but I take the opportunity of pointing out the advantage of developing to the fullest extent the only higher class institution in the presidency which attempts to give mechanical training. We have abundant reasons for perseverance. The Native State of Mysore and other Feudatory States of India send pupils to the Poona College of Science, *and Brahmin pupils are showing a readiness to turn their hands to carpentering. There is thus a full supply of teachable material.* On the other side, the need for enlarging our present system of education and for giving it a more practical turn strikes me as the greatest need of the times. We have too many pupils turned out with a smattering of that class of education which aims at a University career. The notion that the education of the mind and the education of the hands are distinct and even contradictory prevails too widely in India. *A revolution in this state of popular feeling would be effected by the institution of Technical schools alongside of the ordinary Literary school for the practical instruction of those who must earn their living by the work of their hands. If this want is ever to be met, the first need is an outturn of skilled and well trained teachers and foremen.* The Poona College, if properly fostered by Government, appears to me capable of laying the foundation of a great reform. If young Brahmin lads, who are fitted to be masters of our higher primary and our secondary schools, will only go through a course of mechanical instruction in the workshops, whilst they acquire a theoretical knowledge of various crafts in the lecture-room of the

Poona College, we shall have solved the first of our difficulties, namely, the provision of competent teachers. We can then institute schools after the model of that at Rotterdam, which has been introduced into other parts of the Continent. The school there is on the half-time system, the morning being devoted to mental education, the afternoon to practical teaching in the workshop, and the course extends from the age of 13 to 16. The pupils learn drawing, mathematics, physics, chemistry, and the elements of various trades, the best practical workmen being engaged to teach these trades. *It appears to me that any enterprising municipality, which is the centre of various trades, would do well to institute a school of this sort in place of the uniform Lower Anglo-Vernacular School which is copied everywhere. But, in the first place, teachers are wanted, and I would gladly see the workshops of the Poona College largely increased and the institution recognized as in part a sort of Technical Training College for teachers of a new class of Technical Secondary schools of which every district should have one.*

The Poona College is perhaps too ambitious, but in our present experimental stage that is inevitable. Some attempt has been made in this presidency to give a practical turn to our higher education by the creation of agricultural classes in High Schools. The programme which I have sketched above for a course of mechanical instruction is already realized to some measure in regard to agriculture. The class at the college consisted of 46 pupils studying agriculture, of whom 8 passed. It is proposed that the University should establish a degree or license in agriculture, which would open to the successful candidates certain revenue appointments at present reserved for graduates of the University. Meanwhile employment for the passed students is found partly in the department under the Director of Agriculture, and partly in the schools to which an agricultural class is attached.

The various castes and classes of the community are very fairly represented in the college. Brahmins as usual contribute the largest quota, *viz.*, 142 out of 235 on the rolls. Other Hindus number 48, Christians 29, Parsis 11, Jews 4, and of Mahomedans there is only one. There are 17 sons of cultivators, and 26 sons of persons of means. Government officials contribute 63 to the attendance; but almost every class of the community is represented in one department of the college.

Engineering Class, Hyderabad (Sind) High School.

35. An Engineering Class has been started in connexion with this School, the attendance last year being 21. The progress made has not yet been very encouraging, the students especially showing but little aptitude in practical levelling and surveying. Steps are being taken to improve matters, and it is to be hoped that this very interesting experiment to graft on Technical training to the High School system will be persevered with. The teaching staff at the School seems to be weak.

Bombay School of Art.

36. The next institution for Technical instruction in the Bombay Presidency, to which attention may be called, is the Sir Jamsetji Jijibhai School of Art, in regard to which Mr. Lee-Warner in his Education Report for last year speaks thus :—

The attendance returns for the last three years are—

	Number on the rolls at the close of the year.	Fee receipts.
1882-83	184	1,706
1883-84	213	2,140
1884-85	251	2,340

The following table indicates the subjects of instruction in the school, and also the distribution of the pupils through the various classes :—

	1883.	1884.	1885.
Elementary School	158	179	200
Architectural Drawing Class ..	21	15	27
Painting Atelier	12	23	18
Sculpture Atelier ...	9	8	8
Wood-engraving Department ...	5	2	.....
Pottery Department	16	*Nil*	.....

The returns for the grade examinations for the last three years are as under :—

	1st Grade.		2nd Grade.		3rd Grade.		Total	
	Presented.	Passed.	Presented.	Passed.	Presented.	Passed.	Presented	Passed.
1882-83	343	92	75	44	9	3	427	139
1883-84	403	159	75	24	24	4	502	187
1884-85	507	151	77	42	23	8	607	201

The statistics show the continued extension of the influence of the School of Art over High Schools, not merely in the presidency, but even outside its limits. The figures are at first sight misleading without fuller explanation. Two classes of candidates are included in the above table,—those educated in the Bombay School of Art, and those educated elsewhere but brought under the test of its examinations. The larger figures given in the second table above include candidates from the mofussil Middle Class Schools. With a view to introducing drawing more generally into the school course, Government laid down in January 1880 a course of instruction called the 1st grade art, which included freehand drawing, model and object drawing, and practical geometry. For more advanced students, a 2nd grade Arts course was prescribed, including the subjects given above, and linear perspective and delineation of diagrams on the blackboard. The time has now come when the standard may fitly be raised, as prizes are awarded to all who pass the standard of excellence prescribed. It

is very satisfactory to note that under the stimulus of these small prizes, and in consequence of the facilities afforded by the supply of teachers sent out from the School of Art, no less than 33 schools, besides the School of Art, supplied competitors. A few of these were aided schools, and some were schools outside the presidency, such as the Nagpur Normal School, the Bhuj and Rajkot Schools of Art, the Kolhapur and Baroda School, and the Amraoti High School. The value of the addition of drawing, and of the facilities offered for teaching and examining it by this Department, are thus recognized, not only in the Native States, but in the Berars and the Central Provinces. I hope that in time these States will contribute their share to the cost of the examination and of the prizes; but meanwhile, beyond raising the standard, I have taken no steps to check the widest distribution of this small attempt at introducing a demand for some accomplishment not directly connected with the University degree course.

Returning from this explanation to the figures showing the work done in the School of Art, I notice that the examiners report a slight improvement in the freehand drawing of the elementary schools, while in model drawing the high standard attained last year has been maintained. The drawings in geometry were considered to show the conspicuous care devoted to instruction in this subject, and the work in perspective was pronounced exceptionally good. In the works submitted, showing outline of ornament in low relief from the cast, a decided improvement was observed; but in foliage drawn from nature there was a slight advance noticed in the work of the year. In the sculpture atelier a falling off was observed. In the architectural drawing class there were 23 students, of whom the lecturer, Mr. Adams, reports that they have made very great progress both as draughtsmen and in the knowledge of architecture.

I attach great importance to a scrutiny of the various classes and castes which attend the different classes of institution The conspicuous absence of Mahomedans and the paucity of Christians in the Arts Colleges and even in the High Schools afford indications that what may be called the University course does not attract these classes of Indian society. It is therefore satisfactory to notice that in the School of Art the overwhelming preponderance of a single caste, which has been observed in the Colleges, does not exist. The average daily attendance in the School of Art has been 148, but altogether 378 students attended the School at one time or another during the year. Of these, 200 were Hindus, 53 being sons of artizans, 24 the sons of cultivators, and only 52 Brahmins. There were 14 Mahomedans, 83 Pársis, 68 Christians, and 13 Jews. Of the Christians, 28 were Europeans, 5 Eurasians, 34 Portuguese, and one a Native convert. This distribution is satisfactory, as showing that the school meets a need in all classes of society, and the instruction it affords in the technic art of architecture and the phonetic arts of sculpture and painting may be expected to produce a widespread influence in the future.

High School Classes in Agriculture and Drawing.

37. The tabular statement presented in paragraph 12 of this Note will have shown that Bombay alone of Indian provinces has in any way

anticipated the bifurcation of studies commended by the Education Commission by introducing Agricultural and Art classes into High Schools. In connection with the High Schools at the places noted in the margin, Model Farms have been established, and Agricultural classes designed for the children of agriculturists, who are encouraged by scholarships of the value of Rs. 4 a month to attend the Model Farms for instruction in practical agriculture. The course includes chemistry, physics, botany, physical geography, and geology; besides which the student may take up land surveying and physiology. The following observations of the Director of Public Instruction in his last report will show what is being done in this direction:—

Dhulia, Ahmednagar, Belgaum, Nasik, Sholapur, Surat, Hyderabad (Sind), and Nadiad.

The review of the work done in the Agricultural classes would more conveniently follow the remarks given on the College of Science. It is through the supply of the teaching material prepared in the College of Science that it became possible to graft instruction in agriculture on the High School's course. There is a small but steady improvement in the results attained from year to year. That we have not attained larger results is due in some measure to the want of adherence to the scheme sketched out by His Excellency Sir Richard Temple. Original designs are apt to be forgotten when the construction is completed, and therefore it will not be out of place to re-call attention to the design prepared in 1878. It was expected that the University would give a degree in Agriculture, and that the students attending the Agricultural classes of the College of Science would partly be studying for a University degree, involving a course of three years' study, and partly aiming at a College certificate to be given after two years' study in the College. During the past year some advance was made in laying before the University a scheme for a degree in Agriculture. The subject is still under their consideration; but I am inclined to think that the first essential to that result has not yet been fulfilled, namely, the addition of a Model Farm to the College of Science. In regard to the second part of the scheme, the College certificates have gained a marketable value from two causes—first, certificated masters are thus rendered available for the High School classes; and, secondly, the creation of an Agricultural Department has directed the attention of those who are entrusted with its patronage to the High School classes. The High School classes were intended to be special classes of the ordinary High School in which education in agricultural chemistry, in botany, and in surface geology might be given to boys willing to receive it, who would be excused certain lessons in the ordinary course. According to this plan, the boys thus learn something in school about crops, manure, soils, stock, and implements, whilst attached to the school is a small farm in which they may practise the principles acquired in the school-room.

38. Notwithstanding that the attendance at the Drawing classes is voluntary,

already 2,713 pupils are under instruction. The classes are attached to Government schools alone, but students of other schools are encouraged to attend them. Certificates of two grades are given; and schoolmasters who hold the qualifying certificates and teach drawing in their own schools receive an additional grant. On the subject of drawing classes, Mr. Lee-Warner has the following remarks :—

> Five new drawing classes were started and one closed during the year under report, and the number of children taught is increased from 2,234 to 2,713.
>
> * * * * *
>
> The new classes were opened as follows: two in Aided schools, one in a Government school in Sind, another in the High School at Baroda, and the fifth in the Amraoti High School in the Berars. When it is borne in mind that the change in our system was only commenced in 1880, and that in the first year of its operation but one school outside the city of Bombay joined in the scheme, then its extension to Amraoti, Baroda, and Nagpur in the interval of four years may be regarded as an encouragement to those who desire to introduce into our Secondary Schools a more varied type of instruction than that which obtains marks in the University Examination.

Later on something will be said on the desirability of making drawing an obligatory subject in all Middle and High Schools, if we cannot at present go lower down. The importance of drawing as an essential requisite for and introduction to all systems of Technical training has been greatly accentuated by the recently published Report of the Royal (English) Commissioners in Technical Instruction.

Bombay Medical Schools.

39. It remains to state the condition of things in Bombay in regard to Medical and Industrial Schools. Omitting mention of the Subordinate Medical School attached to the Grant College, the Medical Schools are three in number—one at Poona, one at Ahmedabad, and one at Hyderabad (in Sind). The following remarks taken from the Director's Report indicate that, while there is room for improvement as far as the attendance at these Schools is concerned, the general prospects are not discouraging in this very important branch of Technical training :—

> The attendance in the Byramji Jijibhai School at Poona has fallen from 57 to 52, while that at Ahmedabad has risen from 52 to 63. The attendance in the Hyderabad School has also risen from 38 to 49. At the Poona School 9 pupils passed in the first year's course and 12 in the second year's course at each examination, while at the final examination of pupils in their third year 22 passed.

Amongst the students are three Mahomedans. Dr. Cook reports that the general conduct of the pupils was on the whole good.

The Ahmedabad School has entered upon its sixth year, and at the closing examination 13 passed out, 16 passed in the second year and 20 in the first year's course. Dr. Robb writes in high terms both of the conduct and of the progress of the pupils. The year under review was the first year in which the Hyderabad Medical School, opened in July 1851, submitted its pupils to the test of the final examination. The pupils consist of native medical pupils and High School pupils, and the object in view is to provide the province, isolated as it is from the rest of the Bombay Presidency, with qualified practitioners, as well as to recruit the local Subordinate Medical Service with suitable candidates. Eight High School pupils and eight native medical pupils passed the final examination. Surgeon-Major Keelan draws attention to the urgent need for increased accommodation for the school.

Bombay Industrial Schools.

40. Excluding the David Sassoon Reformatory, with its 215 inmates (who are partly convicts, partly free students), the chief Industrial Schools in Bombay are those at Ratnagiri and Byculla, in regard to which the Director reports as follows:—

The School of Industry at Ratnagiri was established by the orders of Government, dated March 25th, 1879. In 1863 a school was started on a private basis, unconnected with Government, which developed into a Saw Mills Company, but failed in the share mania. The building, plant, &c., of the old Company was offered in 1879 for Rs. 25,000, and the Local Funds Committee purchased it. Thus originated the Industrial School, which is under the management of a Local Committee. It turns out annually a number of lads of the artizan and labouring classes, who are well instructed in useful mechanical arts, and whose woodwork has gained favourable notice at the Exhibitions at Poona and elsewhere. The Educational Department has no concern with the management of the workshops, and is merely interested in the education of the lads. During the past year there were 92 boys in the school against 91 in the preceding year. The results of the examination showed very satisfactory exercises in drawing, but in other respects the Inspector remarks that "the boys have been pushed on rather faster than is good for sound progress."

The history of the Byculla institution further illustrates the difficulties attending the extension of Technical education. In 1879 the Council of Directors of the Education Society recommended an alteration in the course of instruction with a view to preparing boys for the mechanical trades. Certain boys on attaining the age of 16 were to be put to work in workshops, and boarded in the Society's Apprentices' Home until they had qualified for suitable situations as mechanics. Government were asked for a grant of Rs. 20 a month for each boy above 10 in number and under 40, and the Society undertook to admit boys of good character from other schools when there was room for them in the Home. Government sanctioned these proposals in

Government Resolution No. 918, dated July 24th, 1880. In December of the following year the Society, finding that the number of apprentices did not correspond with their expectations, asked for a modification of their original proposal. They applied for allowances for three-fourths of the boys in the Home instead of only for those in excess of the number, 10. Government in their Resolution No. 533, dated April 11th, 1882, fixed a grant of Rs. 10 a month for 3 years for three-fourths of the whole number of inmates of the Home. As the employers would not execute indentures, regular attendance at the workshops was made a condition of payment of the grant. Government also expressed their expectation that the Society would give suitable education out of work hours. The year under report was the closing year of the above arrangement. There were 24 youths in the Home, four of whom came from other schools. They were employed in the workshops of the Great Indian Peninsula Railway Company, the Docks, and the Port Trust Committee, and their progress is reported as satisfactory. The want of a drawing master is, however, represented by the Educational Inspector.

There are three other Industrial Schools in the Bombay Presidency, but they are small and of no marked educational importance at the present time. It is the hope of the Officiating Director of Public Instruction, Mr. Lee-Warner, that in course of time Municipal Boards will distribute a net-work of Industrial Schools over the presidency, and he advocates the concession of liberal grants-in-aid by Government in support of such institutions. These remarks indicate a line of policy which should not be lost sight of.

Bengal.

41. For the higher professional training in Law and Medicine, Bengal is well equipped. The law possesses great attractions for the Bengali mind, and the law classes in the various colleges are well filled. The Calcutta Medical College is also a flourishing institution, in no need of special aid or encouragement from Government. The Engineering College at Sibpur, near Calcutta, has made progress; but it may be doubted whether it has yet established itself as a popular Educational Institution. It is at present isolated, with no Technical Schools of a preparatory sort leading up to. This is a defect not peculiar to Bengal, which it is understood to be His Excellency's wish to remedy.

Calcutta School of Art.

42. The first institution for Technical training of lower than collegiate rank to which attention is invited is the Calcutta School of Art, regarding which the following

remarks occur in the last Bengal Education Report :—

The number of students on the roll continues to increase. There was 157 at the close of last year, against 139 in 1883-84, and 96 in 1882-83. The subjects taught continue to be the same, and the same standard of excellence is maintained. A very high standard in each stage has now been firmly established, and is well worked up to. It is the opinion of competent authorities that the students' work will stand well in comparison with that of any School of Art in England or elsewhere.

The lithographic class is still employed upon the plates for Dr. King's great work on the Indian order Ficaceæ, and the Committee for the Exhibition to be held in London next year have sought the assistance of the school for—

(1) a collection of work illustrating the various stages of instruction forming the school course;

(2) works in metal *repoussé*;

(3) wood-carving;

(4) designs for Monghyr slate works;

(5) designs for pottery;

The Principal anticipates that the school will acquit itself creditably in all these matters. He speaks in high terms of his staff of assistants, who are all natives and old students of the school, and particularly of Baboo Annada Prosad Bagchi, the head-master.

The receipts from fees were Rs. 3,406 against Rs. 2,803 in the previous year, and the expenditure was Rs. 22,642 against Rs. 18,109.

It may be noted here that the Government of India has recently recommended to the Secretary of State a proposal for strengthening the teaching staff of the Calcutta School of Art, and placing it under the control of a thoroughly competent Principal, to be engaged in England. It is understood to be the intention of the Bengal Government to strengthen and develop the demand for Art education by establishing, as time goes on, subsidiary schools in the chief cities and centres of the interior.

Medical Schools.

43. Besides the Medical School attached to Medical College, in which instruction is conveyed through the medium of the English language, there are four medical schools in Bengal,* in which instruction is being imparted in the vernacular. When the preliminary standard of education was raised for candidates for medical degrees and licenses in the Medical College, a more satisfactory guarantee of preliminary education was required also from candidates for admission into the vernacular schools. In consequence probably of this the number of students in the vernacular schools fell during 1877-78 from 862 in the previous year to 686.

* At Sealdah, Dacca, Patna, and Cuttack.

During 1879 the system of education of this class of medical subordinates was revised. Passed students of these vernacular schools were intended to be (*a*) Hospital Assistants and not independent practitioners until they had received additional instruction at some hospital for at least two additional years, when they might, if considered fit for it, be appointed to small places where the services of an Assistant Surgeon could not be afforded; and (*b*) village practitioners, who should in poor villages supplant baids, hakims, and kobirajes. The education these men were receiving became too theoretical for these purposes; and with a view to rectifying this, as well as other imperfections in the existing system of their education, it was decided (*a*) to limit the numbers taught; (*b*) to raise the standard of preliminary education; (*c*) to simplify the lectures, making them more tutorial; (*d*) to make the periodical examinations more frequent; and (*e*) to make the training more practical. These measures are said to have been attained by greater proficiency in the candidates who pass out of these schools. During 1882-83, owing to the abolition of the school at Nagpur, Central Provinces students were transferred to Bankipore. During 1883-84 the following numbers obtained diplomas at these schools :—

Campbell (Sealdah) Medical School, 37 out of 47 candidates

Dacca Medical School, 33 out of 40 candidates.

Temple (Patna) Medical School, 23 out of 34 candidates.

Cuttack Medical School, 9 out of 9 candidates.

During 1882-83 a Homœopathic School independent of Government was started at Dacca, and 46 pupils attended it. In the following year 144 attended, and during 1884-85 a second Homœpathic School was started.

Industrial Schools

44. The Bengal Education Report for last year shows five Industrial and four Survey Schools attended by 172 and 171 students respectively. Only three of the Industrial Schools at present seem to subserve any useful educational purpose; and among these three the only school which is a really promising institution is the Industrial School at Mahisadul in the Midnapur District, which the public-spirited local zemindars have founded and endowed. This school is popular, having 68 students in the first year of its existence. Carpentry is the chief industry taught.

The Survey Schools at Dacca, Patna, and Cuttack are well spoken of; and the course of training, comprising as it does instruction in the rudiments of engineering, road and bridge building, &c., is declared to be as practical as can be desired at present. It is stated that, as a rule, passed students of these schools find little difficulty in obtaining employment.

On the whole, however, Industrial Schools in Bengal are at present mere excrescences on the educational system, formed on no plan, and having no well-defined object in view.

PUNJAB.

Lahore Law School.

45. The latest information available regarding the Lahore School of Law is contained in the following passage from the Punjab Education Report for 1884-85:—

The Law School, which is maintained by the University, sends us no report. It appears from the statistics, which are now for the first time included in our returns, that it had on its rolls at the end of this year 71 students, and that the cost of maintenance was Rs. 4,572. The income derived from fees was Rs. 3,070; and this, added to the fees for Law examinations, I understand to more than cover the whole University expenditure upon teaching and examining in law.

The school passed nine out of 37 candidates for the first, and 5 out of 24 for the final examination; these results being very markedly better than those obtained by private tuition, and than the corresponding results of last year. During this year the rules for the management of the school and constitution of the examinations in law have been revised. An Honour examination has been added, and the educational qualifications required for admission to the examination have been raised. At the same time the Chief Court has raised the standard of the University examinations required of candidates for admission to the local bar; and the result can hardly fail to be advantageous to the profession, though it may perhaps reduce the number of students in the Law School.

Lahore Medical School.

46. The Lahore Medical School consists of two departments—an Upper, in which the students are instructed through the medium of English during a course of five years, when they may obtain a diploma as Licentiate in Medicine and become eligible for employment under Government as Assistant Surgeons; and a Lower, in which students are taught in Urdu to the standard of Hospital Assistant requirements in a course of three years. The admission of women to the classes has been sanctioned, and last year—the first of the experiment—11 female students, 8 of whom only spoke the vernacular, were attending the school.

The preliminary standard of education for students entering the Upper Division is not so high as it is in the Medical College, Calcutta, the Entrance Examination standard being accepted. Up to 1879, 76 Assistant Surgeons had entered Government service from this school. Last year there were 77 students in this Upper Division.

The Lower Division or Vernacular class comprised—

(*a*) those selected by Government to become hospital assistants, and who had passed a year previously in regimental hospitals;

(*b*) those educated by local funds to become native doctors at civil dispensaries;

(*c*) hakims or their relatives.

In 1880 a new class was formed of civil medical pupils to be trained as hospital assistants for civil dispensaries, who were required to have a sufficient knowledge of English to be taught in that language. During 1883-84 there were 82 pupils in this Lower Division.

Dhai class.

There is also a midwife class, the pupils attached to which attend weekly lectures given by medical officers attached to the school. Their services are held in high estimation by the native population.

Measures have recently been sanctioned by the Secretary of State to increase the teaching power of this school; and it is to be hoped that degrees in Medicine will in course of time be conferred.

School of Art.

47. The Mayo School of Art at Lahore is intended to train craftsmen in the higher and more artistic branches of their crafts, more especially in the principles of design, and to exercise a general influence over the more artistic industries of the province by acting as an æsthetic centre, a school of design, and a source of enlightened criticism and advice.

The following is the curriculum pursued in the school :—

All students, without exception, are required to pass through the following Elementary Course :—

(1) Blackboard Demonstrations of Free-hand Drawing and Outline from the Flat.

(2) Elementary Geometry.

(3) Outline from the Round.

(4) Rudiments of Perspective (Model Drawing).

(5) Light and Shade from the Round.

(6) Plant Drawing from Nature.

(7) Elementary Studies of Colour.

This course will be succeeded by more advanced and technical instruction suited to the aptitude and inclination of the students. The following are the chief subjects taught :—

(1) Architectural Drawing and Design suitable for Mistries and Draughtsmen.

(2) Advanced Perspective.

(3) Wood Construction and Ornamentation, as Wood-Carving, Cabinet-Work, &c.

(4) Modelling in Clay and Moulding in Plaster; Architectural details for Terra-cotta, Stone Carving, &c.

(5) Modelling from Nature.

(6) Painting in Oil, Water-Colour, and Distemper.

(7) Lithographic Drawing.

(8) Engraving on Wood and Metal.

(9) Textile Design, as Carpets, Embroideries, &c.

In all architectural and decorative work the principles of Oriental design are considered of the first importance.

The following extracts from the last report of Mr. Kipling, the Principal of the School, will serve to indicate the character of the teaching pursued in the school :—

The bulk of our students continues to be drawn from the artizan classes; and to many of them the two hours' daily instruction received by the junior classes in reading, writing, and arithmetic from the school Maulvie is of great value.

Of the youths sent up by Municipalities and District Boards, some are progressing favourably, but others have come up too young. In cases where such bodies employ draughtsmen, it might be worth their while to send them to the school for instruction in design, carpentry, &c.

The following Municipalities and District Funds provide stipends for the maintenance of youths sent by them for instruction: Amritsar Municipality, 2 students, Rs. 10 and Rs. 5 per mensem; Kasur, 2 at Rs. 5; Jhang, 1 at Rs. 5; Gujranwala District Fund, 1 at Rs. 5; Jullundur District Fund, 1 at Rs. 6; Gujrat District Fund, 1 at Rs. 6; Sialkot, 1 at Rs. 5; and the Nabha State, 2 at Rs. 11 each.

The most important work of the year and the most complete in point of accomplishment was the drawing done for the illustration of the Journal of Indian Art, including architecture, Mooltan pottery, ivory-carving, and other subjects. Drawings were also made for carpets, screens in carved wood, for choice examples of Koft work, Hoshiarpur inlay and wood-work, most of the latter being given out for execution to artizans in the districts for exhibition at the Indo-Colonial display in London. The most important piece of original design was the billiard-room for His Royal Highness the Duke Connaught at Bagshot Park. This was begun by Ram Singh and myself during the last vacation; and we succeeded in satisfying our patrons with a project for lining the new billiard-room with an elaborate arrangement of carved wood in the style of the last century of Punjab wood decoration. These designs and drawings, though chiefly the work of myself and Ram Singh, Assistant Master, were worked upon by the

younger students, who made full size experimental drawings, models, &c.—perhaps the most instructive practice that can be found. The actual work is too large and heavy to be undertaken in the school, and it is given out on contract to a carpenter at Amritsar who works under the direction of Ram Singh; while some of the choicer panels, &c., are reserved for the practice of the wood-carving class in the school. In addition to the lining of the billiard-room, all the furniture for the apartment was designed in the school, so as to be in keeping with the rest. In a similar way the design for a carved screen, the gift of the Punjab Government to the Indian Institute at Oxford, was elaborated in the school on lines suggested by Mr. Basil Champneys, the Architect of the Institute, and actually carried out at Amritsar.

This school is capable of doing a great deal to rescue the art of Northern India from forgetfulness and corruption; but, like the similar schools in Bengal, it is now isolated, and owing to this isolation incapable of producing the full effect in the arts and industries of the province which under better arrangements might be produced. The number of students has risen from 33 in 1882 to 185 last year, and it is probable that the numbers would be even larger had the Principal's attention not been diverted to some extent from his proper duties by preparation for the Colonial Exhibition; still much good is in an indirect way done by such preparations. "It cannot be denied," says Mr. Kipling, "that the searching out and bringing forward of the great industrial and artistic capabilities of the province is of some use to the school, in that it brings us into contact with the best workmen, and gives that practical turn to our work which is so easily missed in theoretic teaching. The examples of Oriental design in the forms of engravings, photographs, books, and our own drawings and casts that are gradually accumulating are of great use to artizans who come up from time to time to take instructions for special objects."

Industrial Schools.

48. There are four Industrial Schools attended by 93 students in the Punjab; but the schools seem worthless for any practical purpose, and the Director of Public Instruction is disposed to close them. He says they "have a tendency to degenerate either into charitable institutions or into factories supported by public funds. They do not introduce improved methods or special skill. The technical instruction they impart can be better obtained in local workshops, while the general instruction can be more effectively and more cheaply given in night schools."

This testimony is not very encouraging as to the immediate future of industrial

training in the Punjab. But the complaint has been heard in other provinces also; and later on some remarks will be offered both as to the source of the difficulty and as to its remedy.

North-Western Provinces and Oudh.

49. Under University Education, reference has already been made to the Law classes in the Benares, Muir, and Canning Colleges, and to the Engineering College at Roorkee.

There is no School of Art in the United Provinces which are so full of artistic industries; and this is a defect which should assuredly be remedied.

Medical Schools.

There is no institution for imparting the higher education in Medicine; but the Agra Medical School instructs pupils up to the standard of Hospital Assistants.

Four classes of students attend this School:—

(*a*) Military students who have already passed one year in regimental hospitals.

(*b*) Civil students of the North-Western Provinces.

(*c*) Civil students for Rajputana.

(*d*) Private pupils.

The course of instruction extends over three years. The civil students (*b*) are admitted upon passing the Anglo-Vernacular examination or the modified Anglo-Vernacular examination. The former preliminary examination was found to be too severe a test; but those who enter through the modified preliminary examination upon passing out of the school obtain the lower rate of pay given to Hospital Assistants. The School is doing very good work, and appears to turn out a sufficient number of qualified men to meet the demand.

Forest School.

49*a*. The Imperial Forest School intended for the technical training of Executive Forest officers was established in 1878 as a provincial institution, though students from all provinces were admitted. The first theoretical course was held in 1881, when 30 students, arranged in two classes, attended lectures on forestry, botany, forest law, natural science, mathematics, and surveying.

Since then the arrangements have been considerably improved, and the school has been converted into an Imperial establishment, and placed under the Inspector General of Forests.

The Director of the Forest School is at the same time Conservator of the School Forests, and thus maintains a direct connection with the management of the forests in which the practical teaching is carried on.

The school was originally established for the professional training of Foresters and Forest Rangers for the Indian Forest Department. It is now, however, open to Forest candidates sent by Native States and to the public.

The school contains two classes—one for Rangers, taught in English; the other for Foresters, where Hindustani is the medium of instruction.

The Rangers class is open to statutory natives of India, who have passed the Entrance Examination of the University or other similar test.

The students go through a course extending over 18 to 21 months, divided into two terms of purely theoretical teaching, and two terms of instruction in the forests.

The first theoretical term comprises mathematics, morphological and physiological botany, and other auxiliary sciences; the out-door term following comprises surveying and general instruction in the forest; the second theoretical term includes forestry in all its branches, including the protection of forests against injuries and diseases, systematic botany, forest law, geology and knowledge of soils, and the drawing and preparation of estimates for roads, slides, and other forest works. During the last term valuation surveys and forest organization are taught in the forest.

The vernacular class is more elementary.

The Forest School grants certificates for Forest Rangers and for Foresters; also certificates of having passed in surveying by the lower and higher standard.

The school has proved useful, and has even during the short time of its existance turned out several able Forest Officers.

During the last term the school was attended by 63 students, including 11 from Madras, 7 from Native States, and 4 private pupils. Of these, 50 attended the Rangers class and 10 that for Foresters.

Industrial and Surrey Schools.

50. There are no Survey and only two Industrial Schools in the Province. These Schools, situated at Gorakhpur and Benares, are orphanages for Native Christian children under the charge of missionaries. It is gathered

from the accounts given of them that they subserve no purpose of general Technical training, even in their immediate neighbourhood.

On the whole, then, it may be said that there is room for improvement in all branches of Technical training in the North-Western Provinces and Oudh.

Burma.

51. Until 1883 there seems to have been in Burma no institution for training in Law, as there is still none for instruction in Medicine or Engineering. In that year, however, the Rangoon College was affiliated in Arts to the Calcutta University, and a chair of Law seems to have been established. The lectures, however, are as yet not recognized by the University; and as the school is only in its infancy, no further reference to it is here necessary. The following extract from the last Report of the Director of Public Instruction will show precisely the position of Technical instruction in the province:—

In addition to the apprentice school conducted in connection with the State Railway Workshop at Insein, I have to notice the opening of a special industrial branch of the Municipal High School at Akyab under Mr. J. Simeon, which has good promise of success.

The Aided Mission Schools under Mr. Nichols at Bassein, Mr. Bunker at Toungoo, Mr. D'Cruz at Bassein, and Mr. Vinton at Rangoon have also for years made carpentry, printing, weaving, book-binding, and other industrial arts part of their course of teaching; printing presses are attached to the Society for the Propagation of the Gospel and Roman Catholic schools at Toungoo; and the Management of St. Paul's School at Rangoon proposes to inaugurate a system of Industrial teaching in their new buildings.

These special schools are designed primarily for the training of Thugyis (or subordinate Revenue Officers), and the regulations under which they are conducted have been again revised in the past year. The revised rules are appended to this report.

From these rules it will be seen that Survey schools are for the present to be conducted in five districts, and that they will be from time to time opened in such places and under such superintendence as the Chief Commissioner may direct.

In the past year Survey schools have been maintained at Akyab, Rangoon, Bassein, Henzada, and Pegu, the school at the last-named place being opened only in January last.

The schools are under the general superintendence of District Officers, and no special reports on their working have been received excepting from Akyab.

From the statistical returns forwarded by the Educational Syndicate and by the Survey teachers, it appears that a total of 41 students succeeded during the year in passing the provincial examination in surveying. Of these, 16 were pupils of the Henzada Survey School and 14 of the Hanthawaddy school.

The Bassein school passed five, and the Akyab school nine. The Pegu school has not yet presented candidates.

Of the great usefulness of these special schools, both in the interests of the public service and of the pupils of our schools, there can be no doubt.

It will be fitting to notice here the working of the special measures adopted by the Government for preparing the youth of indigenous races for the professions of Medicine and of Engineering.

As regards Medical instruction, the practical experiment made some years ago by the institution of classes at district head-quarters conducted by Civil Surgeons showed that it was still premature to inaugurate any local system of Medical teaching, and the plan was adopted in 1881 of selecting yearly a limited number of picked scholars to be sent for training to the Government Medical College at Calcutta.

The allowances made to these scholars are very liberal, and an assured prospect of future employment in the province is held out to them.

It was necessary, at the outset, to obtain from the Bengal Government special leave for the admission to the College of scholars not fully qualified by the regulations of the University; but the number of local candidates passing into the University having increased, there is now no difficulty in selecting fully qualified scholars. At the present time seven scholars from the province are attending the Calcutta Medical College.

The general progress of the students is reported to have been good, though it is doubtful whether the scholars first appointed will be able fully to qualify for the grade of Assistant Surgeon.

The course of training occupies five years, and the ultimate success of the plan has yet to be seen. But there seems every reason to think that the plan is a sound one, and preferable to any hasty attempt to force Medical education in the province before the time.

A similar and subsidiary scheme of Medical education has now been adopted, whereby a fixed number of Burmese scholars are selected annually to be sent to Madras for training as Hospital Assistants.

Six such scholars are now at work in Madras, and the reports of their conduct and work are very encouraging.

Lastly, there has been correspondence in the past year on the subject of offering facilities for the Medical education of women in accordance with regulations lately introduced in the Calcutta Medical College. The subject, which is an important one, is still under consideration.

For the encouragement of the study of Engineering among the best educated youth of the province, a system of scholarships, not less liberal than the Medical scholarships and tenable at the Government Engineering College, Calcutta, has been in operation since 1881.

Four Engineering scholars are now attached to the Calcutta College, and will ultimately be attached to the Public Works Department in the province.

All the special scholarships here noticed are open exclusively to candidates of Burmese or Indo-

Burmese origin, or of other races indigenous to the province.

From the preceding quotation it will appear that if it was not possible to record the existence of any considerable number of institutions specially designed for Industrial teaching, still the recognition of the value of such teaching was extending, and a good deal of unpretentious good work in the direction of Technical training was being done in the principal schools of Lower Burma. In May 1883 steps were taken by the Chief Commissioner to establish a Medical School at Rangoon; but it does not appear that the project has advanced beyond the stage of discussion.

Central Provinces.

52. The returns from the Central Provinces show 19 Industrial schools attended by 361 students; but it is impossible to ascertain from the reports what these institutions are. An examination of the Education Report for last year conveys no satisfactory impression regarding the instruction imparted in these so-called Industrial Institutions.

The Administration of the Central Provinces relies more on the effect of scholarships and studentships tenable at such training establishments as the Poona Science or the Calcutta Engineering College than on the result of direct teaching; and it has accordingly promulgated the following rules to regulate these stipends:—

No. 458, dated 6th February 1885.—The following rules regulating Technical studentships in the Central Provinces, having been approved of by the Chief Commissioner, are published for general information:—

(1) The Government of the Central Provinces has established thirty Technical studentships, of which twenty are for Natives who must have attended at some school in the Central Provinces for two years before election, and ten are for Europeans or Eurasians who have attended a school in the Central Provinces for at least two years previous to election, or whose near relatives are domiciled in the Central Provinces.

(2) No boy will be elected to a Technical studentship after he has passed sixteen years of age.

(3) No Native will be elected to a Technical studentship who has not passed the Middle School examination.

(4) No European or Eurasian will be elected to a Technical studentship who has not passed by the 6th standard prescribed in the Code or Regulations for European schools in the Central Provinces.

(5) Subject to the above conditions, the studentships will be awarded to the best scholars, namely, to those Europeans and Eurasians who pass highest in the 6th or higher standard or who have matriculated, and to those Native scholars who pass highest in the Middle School or higher examination.

(6) The selected students will be medically examined by the Civil Surgeon of Nagpur, and, if passed by him, will be on probation for the first three months; and at the end of that time they will be accepted as apprentices if their conduct and aptitude for the work are considered satisfactory. The time spent on probation will count towards their service as apprentices.

(7) The parent or guardian of each student accepted as an apprentice must sign an agreement in the form appended to these rules, binding the student as an apprentice to the Locomotive Superintendent of the Nagpur and Chhattisgarh State Railway or to the Assistant Manager, Wardha Coal State Railway, for 4 or 5 years, or to such other officer as the Chief Commissioner may from time to time direct.

(8) During the first two years of the apprenticeship, each apprentice shall receive a stipend, if a Native of India of Rs. 5 per mensem, if a Eurasian of Rs. 10 per mensem, if a European of Rs. 15 per mensem, subject to such deductions for irregularity in attendance, for great carelessness or other misconduct, as the officer to whom he is bound apprentice may direct.

In case of gross misconduct or inefficiency, the stipend may be withdrawn altogether by order of the Chief Commissioner.

(9) After 2 years the apprentice's stipend shall ordinarily cease, unless for special reason the Chief Commissioner allows it to be continued. The apprentice will then be paid by the department in which he serves according to his deserts.

(10) Parents or guardians wishing to obtain Technical studentships for their sons or wards, who may be declared eligible under rule (5), should make application in the form appended to these rules to the Locomotive Superintendent or Assistant Manager above mentioned.

(11) Each apprentice will be trained as a mechanic. Those who exhibit a talent for drawing will be trained as draftsmen, and will be eligible for appointments as Foreman. Those who show no aptitude for drawing, or for the higher branches of practical mechanics, will, after serving for a short time as firemen, be eligible for drivers.

ASSAM.

53. *Assam*, like the Central Provinces and Burma, possesses no institution for

instruction in the higher courses of Technical training; but it is shown as possessing 1 Industrial and 7 Survey Schools. The Industrial Institution (the Williamson Artizan School) does not seem to be successful, nor the prospects promising. With regard to the Survey Schools, the Inspector of Schools, Assam, writes :—

These schools were all handed over to the Director of Agriculture on the 1st April 1885. Previous to that date I was able to visit three of them, and I considered the results very good as compared with anything we have ever attained to in surveying in Bengal.

Hyderabad and Coorg.

54. In the statement presented in paragraph 12 of this Note, neither Hyderabad nor Coorg are shown as possessing any schools for Industrial training. Still the following passages extracted from recent official documents indicate that something in these two Administrations in the way of Technical training is being done.

Coorg.—The Chief Commissioner, reviewing the Report on Public Instruction, writes :—

In the Central School at Mercara education appears to be in a preponderating degree of a classical and mathematical character. In the year under notice, the want of a master interfered for some months with the progress of the class for Chemistry and Physics. * * * In regard to Technical education generally, and specially as concerns its application to the pursuits of Medicine, Engineering, Agriculture, and artistic designs and fabrics, Mr. Girdlestone wishes to be informed whether anything more than the apparently limited course now pursued in the Central School is practicable and desirable, and whether Technical education of an elementary character could with advantage be taught in the Primary Schools.—(*Chief Commissioner's Resolution on the Coorg Public Instruction Report for 1884-85.*)

Hyderabad.—The Director of Public Instruction writes :—

In the High schools all the classes, except the first, study the subject of drawing; and at the annual examination it appeared that five of the eight prizes were won by Amraoti and three by Akola. Three boys from the Amraoti school appeared for the 1st grade examination of the Bombay School of Art this year, and all of them passed in model drawing and practical geometry, and one in freehand drawing. The Head Master of the Akola High School says: "Somehow or other the boys do not seem to take very kindly to this art, but improvement may be perceptible by-and-bye." Out of 56 pupils examined in the subject in the Training College, 33 passed the test.

The Director promised in his report to submit proposals shortly on the subject of starting a good Industrial School in Berar, as suggested by the Home Department.

PART III.

55. The object of the preceding part of this note was to give a brief statement of the existing condition of Technical Education in the various provinces of the Empire. An endeavour will now be made to set forth as concisely as the nature of the subject will permit the steps taken by each Government to give effect to the orders of the Government of India* enforcing the necessity of improvement in the matter of Practical and Industrial training.

* Conveyed in Home Department letter No. dated 23rd October 1884.

56. It will clear the ground if it be at once said that nowhere, except in Madras, have any practical steps been actually taken to give effect to the orders in question.

From Bombay the information received is more satisfactory for the promise of improvement which it gives than for the results already achieved. The inclination of the Bombay Government seems to be in favour of an extended system of Technical teaching as advocated by the Government of India; but no practical steps, like those to be noticed in the case of Madras, have been yet taken to give effect to this policy. In a recent letter, however, it is stated that His Excellency the Governor in Council has under consideration important measures "for the extension of higher education combined with a wider range of instruction, and for the introduction of practical subjects into the primary standards."

57. From Bengal nothing has been heard, except a general expression of concurrence in the policy laid down. But it is understood that the Lieutenant-Governor is most anxious to give effect to that policy, and that he has before him the outlines of a scheme by which effect may be given to it.

58. From the North-Western Provinces, the Punjab, Assam, and Hyderabad, we have received no notice of practical measures being in contemplation in the direction advocated by the Government of India. From Coorg also no information has come, though it may be inferred from the passage cited in page 39 of this note that the subject is engaging attention.

59. From the Central Provinces no active measures are, it seems, to be expected, if one may judge from the following

passage (in which the Chief Commissioner concurs) from a recent Report by the Director of Public Instruction :—

I am inclined to think that the whole system as prescribed for Madras is much in advance of the state of Native society in that Presidency. But still it is as well perhaps to have a large scheme to work up to. For ourselves, I think that for Science teaching, for Technical training, and for instruction in Art, we must depend on our colleges in affiliation with the Calcutta and Bombay Universities; on our scholarships tenable at Science colleges and at Engineering schools; on Industrial scholarships tenable at the State Railway Workshops and at the Warora Colliery Workshops; on scholarships tenable at the School of Art, Bombay; on the system of apprenticeships in the Public Works Department; and on the appointments and training offered by the Forest Department. It will be necessary, I am afraid, to increase the value of Industrial scholarships. But any proposal on this matter will form the subject of a separate communication, when we have had some experience of the working of our Industrial scholarship system In the meantime, I can only suggest that we proceed steadily in accordance with our present system, and I may point out that whilst Madras has 1 town of more than 10,000 inhabitants, 8 of more than 50,000 inhabitants, 21 of over 20,000, 44 of over 10,000 and 116 of more than 5,000 inhabitants, the Central Provinces have only 3 of more than 50,000, 3 of more than 20,000, 10 of more than 10,000, and 36 of more than 5,000 inhabitants. Technical and Industrial training would naturally be more sought after by an urban than by a rural population. Madras in the larger towns has a large class with whom mental culture is hereditary. In the Central Provinces any such class we may possess are foreigners and infinitely few.

60. From Burma the information is more satisfactory, as the following passages extracted from the Proceedings of the Burma Administration for March 1886 will show :—

Extract from a letter, dated 27th November 1885, from Director of Public Instruction, Lower Burma.

It is impossible not to recognize in the new departure taken by the Madras Government a hopeful promise for the supply of the most crying want of the system of Indian education, as well as an example which may be followed in this province, if only at a respectful distance, with the greatest advantage to all sections of the population; and I feel sure that the cordial concurrence of the Chief Commissioner will be given to any adaptation of the scheme, or to any plan aiming at similar objects which may be found suitable to the circumstances of the province.

In this letter I can do no more than indicate in bare outline the direction which my proposals would take.

The Madras scheme is summarized by its author as a system of public examinations supplemented by liberal grants-in-aid, and the plan which I should propose would fall within the same definition.

A system of public examinations for certificates and rewards may be usefully grafted on to our existing system of provincial examinations; a system of special grants-in-aid will serve to stimulate the study of science, and of practical arts and industries in existing schools; and both together will combine to lead the youth of the province to value more highly than at present the utility of many occupations in life which are at present slighted or left out of sight rather through ignorance than from any other cause.

My scheme would at the outset involve a modification of the existing provincial standards of instruction for Primary and Secondary Schools.

Beginning with the Elementary Vernacular School, it would aim at the encouragement of object lessons and of drawing; and in Secondary Schools the prescribed curriculum would be so modified as to give pupils the option of following a literary or a practical course.

The importance of Technical Instruction being thus practically recognized, Secondary Schools throughout the province would be encouraged, by the offer of special aid in various forms, to open something akin to which is called the "modern side" of English public schools, in which a prescribed standard of instruction in general subjects having been attained, the pupil's energies would be devoted to some branch of special instruction. To each of the Government Normal Schools a special class would be attached for the training of teachers for Industrial Schools.

The Science classes of the Rangoon College might at the same time be largely developed.

Finally, for the special encouragement of Technical instruction, a series of special scholarships would be proposed tenable in any recognized Industrial School, or Industrial department of a school.

The public examinations for certificates and prizes of the students trained under this system would be open only to those who had passed a standard of general instruction equivalent to the Middle School standard.

No. $\frac{188}{86}$, dated the 12th February 1886.

From—A. J. Wells, Esq., Officiating Registrar, Educational Syndicate, British Burma,

To—The Secretary to the Chief Commissioner, British Burma.

In the view of the Syndicate one of the most pressing needs of the province, in the direction of Technical education, is the establishment of a Medical School. They think that too much must not at first be attempted. A shortened course teaching in the vernacular, instruction in the simpler operations of surgery, and in obstetrics would do much. They are aware of the difficulties which beset this project, the chief of which are the want of text-books in the vernacular and of instructors qualified to teach in Burmese. The Syndicate are willing, if desired by the Chief Commissioner, to undertake to procure professional advice in the selection of text-books, and will endeavour to arrange for their translation. It is to be hoped that amongst the students now maintained in the Calcutta Medical College by Government some suitable teachers may be hereafter found. The Syndicate are disposed to think that a commencement might now be made in the selection and translation of text-books. They hope that when the local Medical School is set on foot, the importance of the classes of Native females to partake in Medical instruction will not be overlooked.

They have reason to think that the workshops at Insein are doing excellent service in the cause of Technical education. They have the satisfaction of observing that arrangements were made in 1884 for an increase in the number of studentships at that institution. They are inclined to think that a diploma from the Syndicate might be of service to intelligent and industrious students who have served their time in that institution; and, if the Chief Commissioner desires it, the Syndicate would undertake to conduct an annual examination in mechanical engineering.

The question is still under consideration at Rangoon.

61. It has been stated that the Government of Madras alone of Provincial Governments has already taken action, in accordance with the orders of October 1884, with a view to establish or extend a system of Technical and Industrial training. The aim and scope of the Madras scheme is to be found in the following passage in the report which Mr. Grigg, the Director of Public Instruction, submitted last year to his Government. The passage is long, but the interest attaching to it justifies its quotation :—

In England the system found to be most successful in extending and improving Technical education in Science and Art has virtually been to begin with a system of general examinations, thus creating a demand for trained teaching, and then to train teachers to meet that demand. This system leads to a continually-increasing number of new schools, and to instruction continually improved as teachers are forthcoming, abreast with the most recent progress made in Science and Arts as applied to the industries. Though in the matter of Technical education England has been generally supposed to be considerably behind its Continental neighbours, and though, to a certain extent, this is true as regards France, Germany, and Switzerland (and even Italy too, which, while ranking after the first-named countries, possesses nevertheless a well-organized system of Technical instruction), yet there is no doubt whatever that England, under the present system, is rapidly making up for lost time, and is in some respects beginning to afford a model for Continental countries. The Royal Commission (on Technical Instruction) in its last Report expressly states that "for the Technical education of workmen outside of the workshops the resources of continental countries have hitherto been and are still very much more limited than has hitherto been supposed to be the case," and that "no organization like that of the Science and Art Department or of the City and Guild of London Institute exists in any continental country, and the absence of such organization has been lamented by many competent persons with whom the Commission came in contact abroad."

The lesson to be drawn from the above would seem therefore to be that, in starting in this presidency an organization for the development of a system of improved Technical education, it will be well, profiting by the experience of our predecessors in a similar path at

home and abroad, *to try the stimulating effect of a scheme of examinations, supplemented by a system of liberal grants-in-aid, making at the same time provision for the supply, so urgently needed, of well-instructed and professionally trained teachers. And, in addition to this, steps will need to be taken to develop the Scientific and Art institutions now existing at the presidency, so as to make them, not only teach all or most of the Sciences and Arts of which need is at present felt, but also serve both for the provision of a supply of Science and Art teachers and as models for private effort.*

The italics are not in the original. Special attention is invited to this passage, as it seems to be, as far as it goes, thoroughly sound and good advice.

Public Examinations.—Looking first at the effect of public examinations, it is matter of notoriety that in this country still more than at home *to institute public examinations in any suitable branches of knowledge is to create a demand for instruction in them.* The University examinations have called forth, in numbers far beyond all anticipation at the time they were instituted, both candidates and teachers, and the Middle School examination has been even more successful in that way. * * * It must not be forgotten that the possession of certain knowledge, (provided the knowledge is sound and practical) has a direct tendency to make the possessor seek the means of applying his knowledge to the conditions in which he is placed, and thus gradually there is created a demand for specialists. And, further, the existence of readily accessible schemes of instruction in branches of knowledge mapped out in suitable syllabuses or indicated by reference to particular text-books, leads men engaged in Scientific or Industrial pursuits to seek to acquire additional knowledge in cognate subjects, and such additional knowledge the exigencies of their lives render valuable, although the men may never actually appear for a test examination in it. *Thus the effects of public examinations are far more wide-reaching than the number of candidates who pass examinations would indicate.*

This is quite true.

But, besides these general reasons, there is the more cogent and acknowledged necessity that, for students of subjects not falling within the scope of the University, there should be provided public examinations conducted by examiners of unquestioned special knowledge in the branches concerned, but entirely independent of the institutions presenting the candidates. Even now the Agricultural College, the School of Arts, and two or three Industrial Schools require such a scheme of examinations if they are to work with full success, and if they are to secure a full measure of public confidence, and ensure the certificates they grant being duly appreciated.

This seems a weak point in the Madras scheme. The University should, it is submitted, be the examining body.

It is desirable that at first a considerable number of those who pass the examinations should find employment as teachers, and to encourage this certificate grants will be given to those who have a sufficient number of pupils *bonâ fide* under their instruction in special schools or classes, while result grants will be given on their pupils passing the tests fixed in this and in the Middle School Notification. And, in addition to the ordinary building and rent grants, grants will be given in aid of the building and fitting of laboratories and demonstration-workshops, and the purchase or rent of demonstration-farms. Grants will also be given in aid of museums, partly (it is proposed) in the way of building grants or rent grants, and of money grants for the purchase of models, &c.,—partly in kind from the spare collections of the Madras Museum.

Science, Art, and Industrial scholarships are also provided for, and it is hoped that by these pupils who have shown a bent for Science, Art, or Industries and a certain amount of capacity therein, but who are not able to join special institutions, may be enabled to prosecute their studies further at the Science, Art, or Industrial classes in connection with ordinary colleges. In order to diffuse, as widely as possible, the special instruction contemplated, such classes will be permitted to be either day-classes or evening-classes, and to admit outsiders as well as the students pursuing their ordinary studies at the college to which the class is attached . . . . . The Science, Art, and Industrial classes and schools will offer a sound Technical education to youths from Secondary Schools who are willing to enter Industrial careers, and these classes may also in time be availed of by the more intelligent artizans who have received some education at ordinary schools. Such are at present few, but their number is increasing. Industrial schools are at present few in number; but the proposed scheme will, if adopted, give a stimulus to the establishment of such, and from them a considerable number of candidates may in time be expected to come up for Industrial scholarships that will enable them to carry their Technical studies further than otherwise would be the case. Even already the publication of the last Middle School Notification has had a stimulating effect in this direction, and in a few schools, hitherto entirely of the ordinary type, the constitution of Industrial classes is contemplated, while previously-existing Industrial schools and classes are, I understand, being reorganized on a more systematic footing, so as to work on the lines laid down by Government.

Government Schools and the Training of Teachers.—To give a fair start, however, to Technical education, it is essential that Government should take the lead in such education, as was originally done in England by the establishment of the Government School of Design and the Government School of Mines, and as is at present the case in the vastly-improved institutions that have sprung from these and that now exist at South Kensington as the Departmental Normal Schools of Art and of Science respectively. Even in England, the great Technological Training College of the City and Guild of London Institute did not spring into existence till Government had set the example; and in this country, where there are no corporations with vast funds at their disposal, where private enterprise seldom leads, and where the conditions are in so many respects different, it is still more essential that Government should show the way. Just as in the matter of ordinary education, Government colleges and schools have been found necessary to create a demand for sound education, and to serve as incentments and models for the establishment of private institutions, and to create a supply of teachers, so it will have to be as regards Scientific and Technical instruction. One institution for Science as applied to the industries connected with agriculture, another for Industrial Art, and a third for the profession of Engineering and for the allied subjects, would suffice at first as far as Madras goes, and these can be developed out of the existing institutions—the Agricultural College, the School of Arts, and the Civil Engineering College. It will be necessary to strengthen the Madras institutions which give instruction in Science, Art, or Industries, because, for some time to come, it

will be principally to them that the mofussil and the outlying States will look for a supply of competent teachers. Probably, as in England, local schoolmasters who have a taste for Science or Art, especially those who have graduated in Physical or Natural Science, will, if attracted by sufficiently liberal offers, be willing to come to the capital to receive instruction and training. Others again, not schoolmasters, who have availed themselves of their advantages to qualify as teachers of Science or Art, will seek employment in that capacity, and in this way the means of instruction will in time be made available in all centres of any importance.

In all the examinations that will admit of it, there will be a practical side, and upon this feature great stress should be laid. Half the maximum marks will be assigned to this practical side, and out of that every candidate will have, in order to pass, to obtain at least one-third. This is necessary, because what it is desired to promote is, not knowledge acting on material progress merely indirectly, but knowledge which directly bears upon Industrial development. To quote from a recent speech of His Royal Highness the Prince of Wales: "Hitherto all schools have led up to the Universities, and Literary training has been encouraged to the disadvantage of Scientific instruction. Manufacturing industry has consequently not been able to attract to its pursuits its fair proportion of the best talent of the country." Not only is this still more decidedly the case in this country, but even such Science teaching as has been encouraged has been mostly theoretical, and certainly has had no direct reference to Industrial pursuits. A Science B.A. of the Madras University does not learn enough practical Science to earn his living in any Industrial pursuit in which the practical application of some branch of Science is requisite. That those competent to do good practical work will find employment there can be little doubt. Even the students of the Agricultural College and of the School of Art, in spite of the poor general attainments of the majority of them, have hitherto done so; and with an improved and more practical curriculum and a searching experimental and literary examination, they are still more likely to do so. In the syllabus of Agriculture it is provided that the full diploma shall not be granted until the student has in all (including his college course) devoted five years to his profession. Similar conditions are attached to one or two other branches. Good veterinarians will find their services in good demand, and so will good builders. Even for foresters there is a demand outside the service of this Government or of the Government of India, as Native States and large zemindars are becoming alive as to the necessity of employing them. Trained machinists have hitherto had to be brought out from England. A local supply would meet a demand slowly but surely tending to increase.

Agencies.—In each Government college, when pupils can be got in sufficient numbers to form a class, Science teachers and Drawing masters will, as soon as practicable, be appointed, and some of the existing ordinary teachers will, should the Government approve the proposal, be offered inducements to qualify in special branches, receiving grants as an addition to the salary for extra work done by them as Science or Art teachers. In most large towns there are a number of young men of some education, who will, I hope, be ready to

join such special classes if the fees at first are fixed at a very low rate, and this is the very class which it is so essential to direct to Industrial occupations. It has been suggested by the Principal of the Rajahmundry Government College that a carpentry class might be worked in connection with colleges. The experiment might be tried in the Rajahmundry College if a qualified instructor can be procured. In Government colleges the teachers of Science, Art, or Industry should be paid partly by fixed salaries (or, in the case of teachers employed in ordinary teaching also, by fixed additions to their other salary), and partly by payments on the results of the annual examinations. In Aided Colleges it is proposed that aid be given partly on the results as above, and partly by half salary grants to certificated teachers. In the beginning the certificate need not too rigidly be insisted on, provided the department deems the qualifications sufficient for the special work to be done, and the teacher agrees to study for the method and teaching power certificate. When a museum or art collection is opened and approved of by the department, the teacher should be the curator, receiving a small extra stipend or grant, the hope of which will encourage him to push on that part of the scheme.

62. With the proposals thus made by their Director of Public Instruction, the Madras Government dealt in two ways. The Government of India had recommended a bifurcation of studies into (*a*) literary, (*b*) practical courses in High Schools. The Madras Government very wisely, it is submitted, resolved to establish the bifurcation in the Middle School, that is, a stage sooner than had been proposed by the Government of India; and it therefore took advantage of the Director's report to remodel the Middle School examination. The scheme of this examination as it now stands remodelled is reproduced on the margin.* It will befound to contain a variety of Commercial, Technical, Scientific, and Industrial subjects; and if only the teaching staff of these schools becomes in course of time adequate to the subjects to be taught, pupils desirous of qualifying for Commercial and non-literary pursuits in after-life may at this stage acquire a knowledge of the rudiments of the special branches of study or handicraft they choose to enter upon.

63. But the Madras Government was not satisfied with thus remodelling the Middle School examination with a view to making it subserve the purposes of a more practical training. It determined, in accordance with Mr. Grigg's recommendations, to go further and establish an entire system of advanced examinations in Sciences, Arts, and Industries, and, in pursuance of this object, appointed a strong Committee to consider the whole subject with reference to Mr. Grigg's report and the orders of the Government of India. The Committee had instructions to fix the details and the

* The scheme of examination shall comprise the following branches:—

- A First (or compulsory) language
- B Second (or optional) language
- C. Geography, Map-drawing and Indian History
- D Arithmetic
- E Mathematics
- F. English History
- G. Introductory Science with one of the following —
  - (1) Physical Geography
  - (2) Geology
  - (3) Astronomy
  - (4) Animal Physiology.
  - (5) Botany
  - (6) Agriculture
  - (7) Electricity and Magnetism

  Or one of such other branches of science as may hereafter be added to the above list
- H Music
- J (for females only) Domestic Economy
- K Drawing
- L Modelling
- M Wood-engraving
- For males only:
  - N. Carpentry joining, turning, and cabinet-making
  - O Ironsmith's work.
- P (1) Jeweller's work
  (2) Silversmith's work
- Q Printing
- R Tailoring
- S Boot and shoe-making
- For females only:
  - T Needlework either—
    - (1) Industrial special branches either—
      - (i) Dress-making, or
      - (ii) Boot and shoe-making (in part), or
      - (iii) Native tailoring, or
    - (2) (*a*) Plain needlework
      (*b*) Fancy needlework.
  - U Telegraphy.
- V (1) Mercantile Arithmetic
  (2) Advanced spelling and superior penmanship
  (3) Book-keeping.
  (4) Commercial correspondence.
  (5) Commercial geography
  (6) Short-hand writing
  (7) Political Economy
  (8) Fire Life and Marine Insurance

Such other branches of knowledge as may hereafter be added to the above list.

exact character of the syllabuses necessary to carry the policy of the Government into effect. The result was a report, following which the Government of Madras on the 22nd April last published a notification launching the new scheme of Technical and Industrial Examination in that presidency. The important portions of this Notification are here quoted:—

Higher Examination in Science, Art, and Industries.

With a view to give effect to the instructions of the Government of India, as contained in their Resolution, $\frac{1}{3}\frac{0}{0}$, of the 23rd October 1884, HIGHER EXAMINATIONS in various branches of TECHNICAL SCIENCE and ART and in INDUSTRIES will be held at such times and places as may hereafter be determined, and of which due notice will be given.

2. THE OBJECT of Government in instituting these examinations is to encourage advanced instruction in Science and Art, especially in those kinds of knowledge which bear upon the different branches of industry now existing in this Presidency or suitable for it, and to furnish a means of testing wholly, or in part, the qualifications of persons desirous of becoming—

I.—(*a*) Science,
(*b*) Art, or
(*c*) Technical } Teachers; or

II.—Mechanical engineers; mechanical draughtsmen; electrical engineers; telegraphists; builders; designers; engravers; decorative or art workmen in any branch of artistic industry included in this notification; or

III.—Scientific agriculturists; foresters; veterinarians; or

IV.—Managers or foremen of manufacturing, printing, and other Industrial establishments suitable for this Presidency; or

V.—Employés in posts in the Revenue, Revenue Survey, Public Works, Education, Agriculture, Forest, Sanitation, Cattle Disease, Vaccination, or other Departments which require a practical knowledge of any of the branches of Science, Art or Industry in which it is proposed to examine, and for employment in which Government may, from time to time, see fit to recognize these examinations as a test; or

VI.—Employes in similar posts under District Boards and Municipal Councils, or under private employers.

3. THE KIND OF SCIENTIFIC INSTRUCTION that it is proposed to test differs from that given in connection with the University examinations in this, that what is contemplated is not so much Abstract Science or Science studied merely for the extension of knowledge and the enlargement of the mind, but Science viewed in its application to various manufactures and industries. Similar remarks apply to the Art examinations.

* * * *

8. THOSE WHO PASS the examinations will receive SINGLE SUBJECT CERTIFICATES, GROUP CERTIFICATES, or DIPLOMAS, and to some there will, under certain conditions, be given also PRIZES and REWARDS and SCHOLARSHIPS.

THE TEACHERS of passed candidates will be eligible for GRANTS under the Grant-in-Aid Code (see Grant-in-Aid Code).

9. In connection with these examinations, SCIENCE TEACHERS, LECTURERS, AND DEMONSTRATORS will, as opportunity serves and funds allow, be provided in every Government College, which will be provided also with COLLECTIONS OF APPARATUS AND SPECIMENS and with LABORATORIES. Encouragement will be given to all recognized Colleges and High Schools to make similar provision, and to District Boards and Municipalities to establish DEMONSTRATION-WORKSHOPS AND FARMS in connection with the above teacherships and lectureships, so that theoretical instruction may be supplemented by practice.

* * * *

12. The separate SUBJECTS in which examinations will be held are, for the present, those in the following list, which, however, may be added to. Notice of any addition will be published in the *Fort St. George Gazette*:—

NOTE 1.—Till further notice, no examinations will be held in those subjects whose names in the list are enclosed in square brackets [ ].

NOTE 2.—Advanced examinations will for the present be held in those subjects only whose names in the list are printed in CAPITALS.

NOTE 3.—For each subject, except those whose names in the list are enclosed in square brackets, there is published a syllabus of the knowledge required for the examinations, and such syllabuses are on sale at the Madras School Book Society's Depôt, Old College, Nungumbakam, Madras.

Subject:—

1. PURE MATHEMATICS.
2. PRACTICAL PLANE AND SOLID GEOMETRY.
3. Mensuration.
4. STATICS, KINETICS, HYDROSTATICS, HYDROKINETICS, AND PNEUMATICS.
5. APPLIED MECHANICS.
6. HYDRAULICS AND HYDRAULIC ENGINEERING.
7. BUILDING MATERIALS AND CONSTRUCTION.
8. Plan-Drawing from Specification and Estimate-making.
9. SURVEYING, LEVELING, AND SETTING OUT.
10. Earth-work, Road-work, and Railway-work.
11. BRIDGE-MAKING.
12. Machine Construction.
13. Mechanical Drawing.
14. Steam and the Steam Engine.
15. Heat.
16. Light.
17. [Sound.]
18. Metallurgy.
19. ELECTRICITY AND MAGNETISM.
20. PRACTICAL TELEGRAPHY.
21. ELECTRICAL ENGINEERING and Instrument-making.
22. Electro-Metallurgy.
23. INORGANIC CHEMISTRY.

24. Organic Chemistry.
25. Geology.
26. Mineralogy.
27. Physiography.
28. [Principles of Mining.]
29. Agriculture.
30. Animal Physiology.
31. General Biology.
32. Veterinary Surgery and Medicine.
33. Botany.
34. Forestry.
35. Economic Entomology.
36. Hygiene.
37. Drawing, Painting, and Design.
38. Modelling.
39. Wood and Copperplate Engraving and Etching.
40. Photography.
41. Printing.
42 & 43. Carpentry, Joinery, Cabinet-making, and Turning.*
44. Carriage Building.*
45. Boot and Shoe making.
46. Tanning Leather.
47. Silversmith's Work.*
48. Jeweller's Work.
49. Watch Repairing and Clock Repairing.
50. Pattern Designing.*
51. Textile Fabrics, A.—Cotton, B.—Silk.
52. Cotton Spinning.
53. A.—Bleaching, Dyeing, and Printing Cotton. B.—Silk Dyeing.*
54. Carpet Weaving.*
55. Pottery and Porcelain Manufacture.*
56. Glass-making.
57. Paper-making
58. Philosophical Instrument-making.*
59. Tobacco Manufacture..
60. Tailoring.
61. Dress-making.
62. Lace-making.
63. Bread-making.
64. Cookery.
65. [Tuning and Repairing Musical Instruments.]
66. Music.

* * * *

18. In each subject PRIZES will be given if, in the opinion of the examiners, any candidates shall possess sufficient merit.

To the candidate who, in the Preliminary Examination, passes highest in the Presidency, and is not more than 22 years of age at the date of examination, there shall be given a medal or prize, the nature and value of which will be determined hereafter.

To the candidate who passes highest in the Advanced Examination, and is not more than 25 years of age at the date of the examination, there

shall also be given a medal or prize, the nature and value of which will be determined hereafter.

[In MATHEMATICS prizes will be given only in the Advanced Higher Examination.]

19. If, in the opinion of the examiners, candidates show sufficient merit in any subject, to the first three of those candidates who stand at the head of the list of those who pass in that subject at the Preliminary Examination in any year, SCHOLARSHIPS of Rs. 12, 10, 8 respectively per mensem for the next two years will be given, provided they have passed in a subject in which there is an Advanced Examination, and continue to study it in a recognized Science, Art, or Industrial school or class. In each of the subjects in which the Preliminary Examination is divided into stages, and in each of the subjects in which there is only one examination, but that divided into stages, scholarships of half the above amounts, but tenable for one year only, may be given to the three candidates who stand at the head of the list of those who pass in the first stage : provided that in their examination they, in the opinion of the examiners, show sufficient merit, and that they continue to study the subject in a recognized Science, Art, or Industrial school or class.

No candidate shall be allowed a scholarship in Science who has not either at the Preliminary Examination itself, or at some examination accepted by the Commissioner as equivalent, passed the first stage of pure mathematics and of drawing respectively, and in one at least of the Science subjects of the Middle School Examination.

NOTE.—The object of this restriction is that the student, before commencing an advanced Science course, should have acquired such familiarity with the rudiments of mathematics and with practical draughtsmanship as shall enable him to enter with advantage on higher scientific studies.

No student shall be allowed to hold at the same time more than two scholarships. If eligible for more than two at the same time, he shall elect which two he will hold, the scholarship or scholarships rejected passing to the next in order, if, in the opinion of the examiners, he shows sufficient merit.

20. Candidates who pass first or second class in the full Preliminary Examination in more than one subject, and who, in the opinion of the examiners, show sufficient merit, shall, for each additional subject in which they pass, receive REWARDS of Rs. 12 or Rs. 6 according as they pass in the first or second class.

* * * *

64. Such then is the scheme of Technical education, which, in compliance with the wishes of the Government of India, Mr. Grant Duff has organized in his Presidency. As a whole, the scheme is a remarkable one. It gives increased prominence to the Commercial, Industrial, and Technical side of education as opposed to Literary studies; while an excellent point is made by making the bifurcation of studies begin a grade lower down the scale of schools than the Government of India, following the Education Commission's Report, had ventured to suggest. Of course it will be necessary to establish the bifurcation in High Schools too; for High School

students are not always recruited from those who have passed through a Middle School.

But if the Madras scheme has thus its recommendations, it has also its defects. It is not so much concerned with teaching as with testing the results of teaching, and it omits to suggest such a practicable modification of the existing scheme of lower general education as would include in the curriculum the studies and arts proficiency in which it proposes to test. But these defects are defects of omission; they must have been before the mind of the Madras Government, for they naturally arise from a comparison of Mr. Grigg's proposals with the published scheme; and as money and teachers become available, no doubt they will be corrected.* If, however, any scheme for the whole Empire is to be prescribed, these points must not be neglected.

* Article 9 clearly foreshadows the establishment of classes in Government Colleges and High Schools when funds become available.

PART IV.

65. The preceding statement of the condition of Technical education in each province of the Empire, and the measures in progress to improve it has run on to a greater length than had been intended. It seemed, however, better to err on the side of prolixity rather than on the side of conciseness in describing the existing state of things. For it is only by a clear perception of the strong points and the weak points of the present system that we can safely introduce changes or improvements.

66. Generally, it may be said regarding our system of Technical instruction that there is much room for improvement. To begin with University education and with the Faculty of Law, it would seem that only in Bengal are the facilities for study all that can be at present desired. In both the Madras and the Bombay Presidencies sufficient facilities are not afforded for the study of the Law. In only one out of eight first grade colleges in Madras, and in only one out of six in Bombay, have Law classes been established; while since the foundation of the Madras and Bombay Universities,† only 238 degrees in Law have been conferred by the former, and only 132 degrees by the latter. The case is far different in Bengal where Law is taught, and well taught in eight colleges, and where 1,328 degrees in Law have already been conferred by the University. Even in the North-Western Provinces, three out of the total number of five colleges have Law Schools attached.

† By Acts XXVII of 1857 and XXII of 1857, respectively.

67. There is a wide career of usefulness open all over the settled districts of India for trained lawyers. The Bench absorbs a large number, with the result that the administration of justice is greatly improved. And, besides this improvement, there is another gain in the better tone and *morale* of the native civil judiciary, consequent on the criticisms to which they are exposed at the hands of an instructed and independent Bar. It seems therefore that the establishment of Law classes in some or all of their first grade colleges is one point to which as opportunity offers the attention of the Governments of Madras and Bombay might with advantage be directed. On this head the other Presidencies or Administrations do not seem to stand at present in need of suggestions from the Government of India.

68. In regard to University education in Medicine, the organizations in the three Presidency towns seem to be all that the circumstances of the time demand. It may be admitted that *degrees* in Medicine should only be awarded when a high standard of professional education has been attained; and this seems only possible in cities where the services of an adequate teaching staff can be secured, and where the existence of large hospitals affords satisfactory opportunities for clinical and pathological instruction. The number of degrees in Medicine conferred by the Calcutta University (567) is very satisfactory; and the Bombay number (172) is encouraging. The Madras University Medical graduates are indeed few; and if we were not assured that the paucity in their numbers (which all told amount to only 45) is due to some extent to the preference of students of the Madras Medical College for British degrees, one might be disposed to suspect inefficiency in the teaching, or excessive strictness in the examination tests.

69. In the Lahore Medical College recent improvements and additions to the teaching staff have brought the Medical School abreast of the requirements of the time and province, and no further suggestions seem to be called for here in regard to it. The Medical School at Agra, on the other hand, does not rank as a college. It is a school of third rate rank, both as regards teaching power and the character of the diplomas conferred. Having regard to the fact that Agra is the only centre of Medical education for a large and densely peopled tract of British and feudatory territory, it is worth considering whether its teaching

power should not as funds admit be strengthened, and whether the school should not be raised to the same footing as the College at Lahore.

A review of medical teaching in India at the present time would be incomplete without some allusion to the great impetus which is being given to the medical training of women, by the organizations connected with Her Excellency the Countess of Dufferin's Fund On this occasion, however, no more than a passing reference is required.

70. The facilities afforded for University training in Engineering appear, as far as mere teaching goes, to be as extensive and complete as the circumstances of the time require. The Colleges at Calcutta, Madras, Poona, and Roorkee are well-equipped, and the *theory* of Engineering is as well taught as perhaps in England. The defects seem to lie in the too theoretical nature of the teaching, in the complete isolation of these colleges, and in the want of facilities for practical instruction at Madras and Roorkee. The first mentioned defect seems almost inseparable from any system we can devise; but it can be greatly minimized. The workshops at Seebpur and Poona do much towards making the instruction in these colleges of a practical character: and it is suggested that an effort be made towards turning to similar use the important workshop belonging to the Local Government near Roorkee, and towards establishing a connexion with the Railway workshops in Madras. A year's work in these shops would form a very useful adjunct to the existing college course. The second defect is due to the entire want of Elementary and Secondary Schools of a technical character leading up to the College courses. At present the College is the alpha and omega of instruction in Engineering. This is a defect which equally exists in connexion with Schools of Art.

71. So much for the general condition of Technical training of the higher or collegiate description; we now come to Technical training in schools. First, there are the Medical Schools devised to impart a knowledge of Medicine and Surgery calculated to place its possessors above the mere empiricism of *baids*, *hakims*, *kobirages*, and other ignorant native practitioners. The great danger in these schools is a system of instruction too theoretical for the purpose in view. This danger was perceived some time ago in the Bengal schools, and steps taken to obviate it by simplifying the lectures and making them more tutorial, by insisting on more frequent

examinations, and by more practical demonstrations. These improvements will, it is hoped, have the desired effect; but it would seem that in other provinces of the Empire as well as in Bengal the evils thus guarded against operate to a very great extent. It is desirable therefore that other Local Governments should be invited to consider the mode of instruction in these schools, with a view to rendering it more practical and intelligible to the class for whom the schools were devised. In neither Bombay nor Madras do these Medical Schools seem to be as popular as could be wished, and it would be gratifying to know that this apparent want of popularity is not due to defects of system, or to inefficient teaching. The matter is one to which the attention of these Governments might with advantage be called.

Attention has been called to the fact that the flourishing town of Rangoon is without a Medical School. So long ago as 1883 the want was felt; and in the May of that year the Chief Commissioner expressed the intention of soon supplying it. The want is still unsupplied; and the Administration of Burma may now reasonably be asked to attend to the matter.

72. As it is very desirable that medical aid for the people should be disseminated as widely as possible, attention may here be called to the fact that, while Bengal with its comparatively few large cities possesses seven Medical Schools, the North-Western Provinces and the Punjab with their many great cities are content with two schools. In the single city of Dacca in Bengal there is one Alopathic and two Homœpathic Schools, and the competition is only productive of good. The Medical profession even in its lower grades affords to fairly educated men an excellent opening and an independent career.

73. The success which has attended Survey Schools, wherever they have been established, is an encouragement to extend the system. There is in every district in India ample employment for competent surveyors, for the qualifications of the ordinary *amin* leave much to be desired. If, after suitable survey schools had been provided, our Civil Courts employed, by preference, surveyors or valuators who had certificates from such Schools, not only would an impetus be given to this description of Technical education, but a great boon would be in course of time conferred on the people in the provision of a more respectable class of professional surveyors and valuators. Local Governments and Administrations might, therefore, be asked

to take into their consideration this question of Survey Schools. An educational qualification should be insisted upon before a student is admitted to such a school. The character of the students and the reputation of the profession would thus alike be raised in the public esteem. Local Governments might also be asked to consider whether by degrees the surveyorships and valuatorships to Civil and Revenue Courts and authorities should be restricted to passed students of these Survey Schools.

74. On the question of Agricultural Schools and Colleges some opinion has been already expressed. Here all that need be added is that if such schools and colleges cannot now be provided, we should at all events do what can be done by an extension as far as funds allow of that system of Agricultural classes in Middle and High Schools which is found to answer in Bombay. There is room for hope that conjoined with a system of public examinations, this plan will in time supply a demand for higher and more systematic instruction in Agriculture.

75. We now come to Art Colleges and Industrial Schools. The previous remarks made on this subject will have suggested that if these Art Schools in the Presidency towns and at Lahore have not as yet made much impression on the Industrial life of the country, it is not so much because their aims are untrue, as because they keep no touch with the Industrial system they are devised to assist and improve. On the other hand, the so-called Industrial Schools, modelled upon no considered plan, and cut off from communications with the Schools of Art which should be to them sources of inspiration and guidance, never rise above mere workshops for the production of inferior articles at extravagant cost. For all purposes of practical training they are useless; and it is no exaggeration to say that of the 45 Industrial Schools which now exist in India, hardly one serves any true educational purpose. If, therefore, anything effective is to be done in the way of Industrial training in Indian schools, we must begin anew and construct a system of Industrial education. The question for decision is then, upon what principle and by what adaptation of means to ends can such a system be constructed?

76. Authorities* agree in thinking that the true principle from which to start is that Technical instruction must not be considered as something separate and apart from ordinary general education. On the contrary, it should be regarded as a development of such education. The scheme of general education should therefore be so arranged as without any break

* Report of the Royal Commission on Technical Education

Papers by Professor Pedler of the Calcutta Presidency College and Professor Monday of the Sibpur Engineering College

Reports of Mr Grigg, Director of Public Instruction, Madras, of Mr. Tawney, Officiating Director of Public Instruction, Bengal, and of Mr Lee-Warner, Officiating Director, Bombay

A pamphlet entitled "How to introduce National Technical Education into India," by Mr. Dinshaw Ardisir Taleyarkhan (Baroda, 1884), contains some sensible suggestions.

of continuity to lead up to the instruction which we call Technical. If this be the true principle on which to proceed, it is manifest that nowhere in India has our educational system given to that principle the prominence which it deserves. Leading, as it does, to University examinations and University degrees alone, our educational system has always concentrated attention on literary subjects and literary training. But as Technology is the study of the practical application of Science, a system of education which has for its aim the acquisition of literary knowledge only can never be a satisfactory introduction to Technical instruction. As Science is the foundation of every branch of Technical instruction, the principles of Science ought to underlie the education of those whose aim in life is the practice of the Industrial Arts.

77. Education will usually begin with "the three R's"; and it is, of course, necessary that some advance should have been made with the elements of language and mathematics before progress can be made with even rudimentary Science. But all authorities agree that the study of drawing should be introduced at the earliest possible age; that it should be placed on the same footing as writing; and that it should be continued throughout all subsequent stages of the student's educational career. The Royal Commissioners on Technical Education are at great pains to enforce this principle :—

"Your Commissioners," they say, "are of opinion that sound instruction in the rudiments of drawing should be incorporated with writing in all primary schools, both for girls and boys, by which also, according to the experience of competent authorities, the writing would be much improved. Something in this direction has already been done in many good infant schools, where children of the age of six draw triangles, squares, oblongs, &c., on their slates."

78. When some progress has been made in "the three R's," attention should be directed to Elementary Science :

"For the great mass of our working population," write the Royal Commissioners, "who must necessarily begin to earn their livelihood at an early age, it is essential that instruction in the rudiments of the sciences bearing upon Industry should form a part of the curriculum of the Elementary Schools, and that instruction in drawing, and more especially in drawing by rule and compass, of a character likely to be useful to them in their future occupations as workmen and artizans, should receive far greater attention than it does at present. The importance of the first of these subjects has been so far acknowledged by the Education Department, that in all Infant Schools simple lessons on objects and the more commonly occurring phenomena of nature have been made obligatory. This system of instruction, if properly illustrated by the object itself or of diagrams or models of the same or by the simplest kinds of experiments, is an excellent foundation for the subsequent teaching of Elementary Science."

And again :

Geography, if properly taught, is a branch of Elementary Science which need not be separated from Science generally, and can well be taught along with the other branches of Science by means of object lessons. In this way the connecting link between Science as taught in the Infant School and in the higher division of the Elementary School will be supplied.

A preliminary education founded on the preceding principles would form the most appropriate introduction for all forms of Technical instruction that could be devised, while it would help to give to the education of those not intended for Industrial pursuits that practical character which is now so wanting. Children under such a system would have their faculties of thought and observation trained, while now the only faculty that is trained is the memory.

79. Following on such a Preliminary education, of which Reading, Arithmetic, Writing, Drawing, and Elementary Science would form the prominent features, would come that separation of studies which the student's proposed career in life would necessitate. Those who were intended for the learned professions, the Bar or Medicine would follow the literary courses which lead to the existing Entrance Examination of the University. Those who looked to Art or Engineering or Commerce or Agriculture would pursue the "modern" curriculum advocated by the Education Commission, and leading to an alternative Entrance Examination which the Universities should without unnecessary loss of time be invited to establish. Those who looked to Industrial pursuits would enter the Schools of Technical training, if indeed they did not select to push their preliminary education still further by going through the "modern" curriculum. These three divergent courses should take off from the common stem at the end of the Middle School course, as recommended by the Madras Government. The High or Zillah Schools would thus in all cases consist of a "literary" and a "modern" side, which is in full accord with the recommendations of the Education Commission and with the declared policy of the Government of India.

80. It will be observed that the Royal Commissioners recommend the introduction of Drawing and Rudimentary Science into the curriculum of Primary Schools. We must not, however, be misled by identity in nomenclature into thinking the enforcement of suc' recommendation

possible in all Indian Primary Schools. The Indian Primary School is a very multiform entity indeed. In Bengal, where primary education proceeds on the basis of controlling and by degrees improving Indigenous Schools, teaching in the old native plan, the introduction of Drawing or Science lessons into the Village School or *patshala* would be at the present moment wholly premature and impossible. The schoolmasters are unfit to teach such subjects. In Bombay, on the other hand, where very many of the Primary School teachers have passed through training institutions, and teach on approved methods, the introduction of Drawing, &c., into the school curriculum might possibly be enforced. What is suitable for one part of India may be unsuitable for another part; and we shall miss our end if we strive after uniformity which is not attainable. While making due allowance for such local peculiarities as those referred to, and while permitting the utmost freedom to provincial and local endeavours, it seems that for the present we should leave the Indian Primary School out of our consideration; and that in any change of system or addition to the curriculum that may be determined upon the Government of India should not aim at going lower down in the scale than the Middle School. But in every province we should operate through the Middle School (and *à fortiori* through the High School) whether it be founded on an English or on a Vernacular basis. We shall thus circumscribe our efforts, which in a novel undertaking is always desirable; and we shall appeal to a higher degree of intelligence in our students while counting on a more instructed class of teachers.

81. The Middle or High School student, who is able to read, write, and cast up accounts, and has been grounded in the rudiments of Science in addition to knowing something of Drawing, now looks about for a school in which to prosecute his Technical education. It will simplify the difficulty of providing such a school if we first consider what should be taught our student in the school he is looking for.

82. The various industries or professions which may be made the subject of Technical education are classified by Professor Pedler, of the Calcutta Presidency College, under four divisions :—

A.—Applications of Science.

B.—Applications of Art.

C.—Agriculture.

D.—Commerce.

With Agriculture and Commerce it is not now proposed to deal.

The industries classed as "Applications of Science" admit of a further division into five heads:—

A

(*a*) Industries dependent on the application of chemistry, such as dyeing, printing, textile fabrics, paper-making, sugar-refining, glass manufactures.

(*b*) Industries dependent on the application of Physical Science, such as electro-engineering, electro-metallurgy, &c.

(*c*) Industries dependent on the Sciences—geology, metallurgy, mining.

(*d*) The textile industries which depend partly on Physical, partly on Mechanical, Science.

(*e*) Mechanical industries, such as manufacture of cutlery, locks, screws, electro-plating, &c.

The training necessary for those who intend to follow the industries coming under the designation of Applications of Art may be subdivided into—

B

(*a*) training for architects, artists, draughtsmen, designers;

(*b*) training for engravers, wood-engravers;

(*c*) training for modellers and manufacturers of pottery;

(*d*) training for furniture and wood-work manufactures.

83. The preceding classification may be considered for present purposes to exhaust the subjects on which Technical training will be in request for many years to come in India. Indeed, it is obvious that many of the industries are still questions of the future. Some of them, however, are matters of present interest; others of them, though of prospective importance, have now to be provided for; and the question is, how are we to establish the schools in which the necessary instruction can be imparted to students desirous of making a livelihood by the practice of such industries?

Putting out of consideration for the moment the important question of finance, two difficulties here present themselves —the difficulty of obtaining competent teachers, and the difficulty of incorporating the school when we have found our teachers with [illegible] ational system

of the province. The Government of Madras hope to overcome the first difficulty by the operations of private enterprise. They expect, by the establishment of a system of public examinations, to create a demand for trained teachers, and by the effect of this demand to produce the necessary supply. It is probable that the expectations of the Madras Government will be largely fulfilled. This means of stimulating education should therefore not be neglected in provinces outside Madras; but other Local Governments should also be invited to supplement arrangements for training teachers by a system of examinations calculated to stimulate a demand for them. And in this connexion the question arises, whether efforts should not be made to induce the various Universities to undertake the examinations, and thus afford a further evidence that Technical instruction has been made an integral part of the education of the country. This is a point to be referred to at greater length later on. Here it may be said that there is unquestionably great force in the view that examinations should be conducted by the Universities, and not by the Government through Boards constituted for the purpose. The Universities have become a power in the land. They are looked up to and revered by the educated classes. If they can be moved to identify themselves with this movement in favour of Technical education, their countenance will more than any other influence tend to counteract and abate those feelings whose nature and force Mr. Kipling (a competent authority) thus describes:—

> The prejudice against manual labour which exists among the upper classes is still stronger than many of us are apt to think; and when we speak of Art, its beauties, refining influences, &c., we do not reflect that for centuries the most important subjects that our school teaches have been set down in the Kama Shastra among the 64 accomplishments—mostly trivial—in which the public women, or Hetairæ of the country, are supposed to be proficient; while philosophy, religion, poetry, *belles-lettres*, administration, &c., were considered the only pursuits to which a man of position should seriously apply himself.—*(Report on Mayo School of Art for 1884-85.)*

84. But, though we may agree to invoke the aid of examinations in the general direction indicated by the Madras Government, we should not trust to that plan alone. It is therefore most desirable to make all the use we can of existing Training Institutions, with a view to turning out competent masters, and to spare no reasonable expense in the way of stipends while the teachers are at the Training [illegible]iculture, and of good pay